3.1 WATER RESOURCES: HYDROLOGY, WATER QUALITY, AND CUMULATIVE WATERSHED EFFECTS

3.1-1 INTRODUCTION

This chapter is organized into three main subsections: Environmental and Regulatory Settings; Evaluation Criteria; and Environmental Consequences and Recommended Mitigation Measures. Hydrology and water quality effects in Heavenly Mountain Resort watersheds CA-1 (Heavenly Valley Creek), CA-7 (Unnamed Tributary to Edgewood Creek), Edge-1/Edge-2 (Unnamed Tributaries to Edgewood Creek), NV-1 (Mott Creek), NV-2+5 (South Fork of Daggett Creek), and NV-3 (Edgewood Creek) are addressed in this chapter. The cumulative impact assessment completed for the 2007 Master Plan Amendment EIR/EIS/EIS (MPA 07) did not contemplate the Epic Discovery Project (Project). As such, this chapter adds the additional calculated cumulative watershed effects (CWE) of the Epic Discovery Project to those estimating MPA 07 at full build out.

Because the Project is an addition to the projects analyzed in the MPA 07, this chapter tiers from and relies on the environmental and regulatory settings, and some of the impact analyses, presented in the MPA 07 EIR/EIS/EIS Chapter 3.1. In particular, the Environmental and Regulatory Settings section updates the physical and regulatory environment since adoption of the MPA 07, as related to the Epic Discovery Project (Project). These updates include: refined watershed areas, updated wastewater discharge requirements, TMDL monitoring results (CA-1 only), flow accumulation mapping (CA-1 and NV-1), and watershed condition and trend summaries based on monitoring results from water years 2006-2013 and equivalent roaded area (ERA) estimates. Much of this additional information has been gathered as part of the ongoing Environmental Monitoring Program required by the MPA 07 mitigation measure 7.5-2.

Evaluation Criteria have been brought forward from the MPA 07 and reviewed for relevancy to the Proposed Action and Alternatives. Points of significance and justifications for the evaluation criteria have been updated as applicable from the MPA 07 to reflect current regulatory and management directives. The mitigation conditions required by the MPA 07, and the results of mitigation monitoring have been reviewed for relevance to this Project.

The Environmental Consequences and Recommended Mitigation Measures section contains the project-level analysis and cumulative impact analysis for the No Action, Proposed Action, and Alternatives. When significant impacts are identified by the analysis, mitigation measures are recommended for avoiding, reducing or minimizing the adverse effects.

3.1-2 REGULATORY AND ENVIRONMENTAL SETTINGS

Lake Tahoe was designated an "Outstanding Natural Resource Water" in the 1980's. The water quality of Lake Tahoe tributaries, including those originating from Heavenly, is important in maintaining the Lake's clarity, scenic value, and ecological balance. Heavenly Mountain Resort (Heavenly) special use operational boundary encompasses over 10,000 acres in California and Nevada and includes portions of 10 separate watersheds ranging in size from 79 acres to 1564 acres. Five of these watersheds lie within the Lake Tahoe Basin, and five lie within the Carson River Drainage Basin.

Figure 3.1-1 delineates the individual watersheds and identifies on-going monitoring station and reach locations. The Project components primarily affect hydrology and water quality in Heavenly Mountain Resort watersheds CA-1 (Heavenly Valley Creek), NV-1 (Mott Creek), and NV-2+5 (South Fork of Daggett Creek). In addition, lesser effects may occur in CA-7 (Unnamed Tributary to Edgewood Creek), Edge-1/Edge-2 (Unnamed Tributaries to Edgewood Creek), and NV-3 (Edgewood Creek). The water quality monitoring program history and monitoring station location details are part of the required on-going Environmental Monitoring Program for the MPA 07 and are referenced to the *Heavenly Mountain Resort Environmental Monitoring Program Comprehensive Report Water Years: 2006-2011* (2011 CMR; CardnoEntrix 2012), 2012 and 2013 Annual Monitoring Reports (CardnoEntrix 2013, 2014) and the MPA 07 EIR/EIS/EIS Chapter 3.1. CardnoEntrix is the contractor working under contract to the TRPA to implement the annual monitoring program at Heavenly.

3.1-2.1 Regulatory Setting

Water quality objectives are set for water bodies to ensure that the beneficial uses will be maintained; for tributary waters to Lake Tahoe, maintaining lake water quality is an additional objective. Water quality objectives for creeks within the Heavenly Mountain Resort are set by the California Water Quality Control Board – Lahontan Region (Lahontan) for the California side, the Nevada Division of Environmental Protection (NDEP) for the Nevada side, and the TRPA for the Lake Tahoe Basin. The water quality standards of these regulatory agencies are described in the *Regional Water Quality Control Plan for the Lahontan Region* (Basin Plan), Nevada Administrative Code Section 4456A.121(2), and TRPA Code of Ordinances Chapter 60. Tables in Appendix 3.1-A identify the applicable state and regional water quality standards that pertain to Heavenly Valley Creek and Edgewood Creek.

In addition to these state and regional regulatory agencies, El Dorado, Alpine, and Douglas Counties also have provisions related to water quality. The follow summarizes this regulatory framework by regulatory agency.

California Water Quality Control Board-Lahontan Region

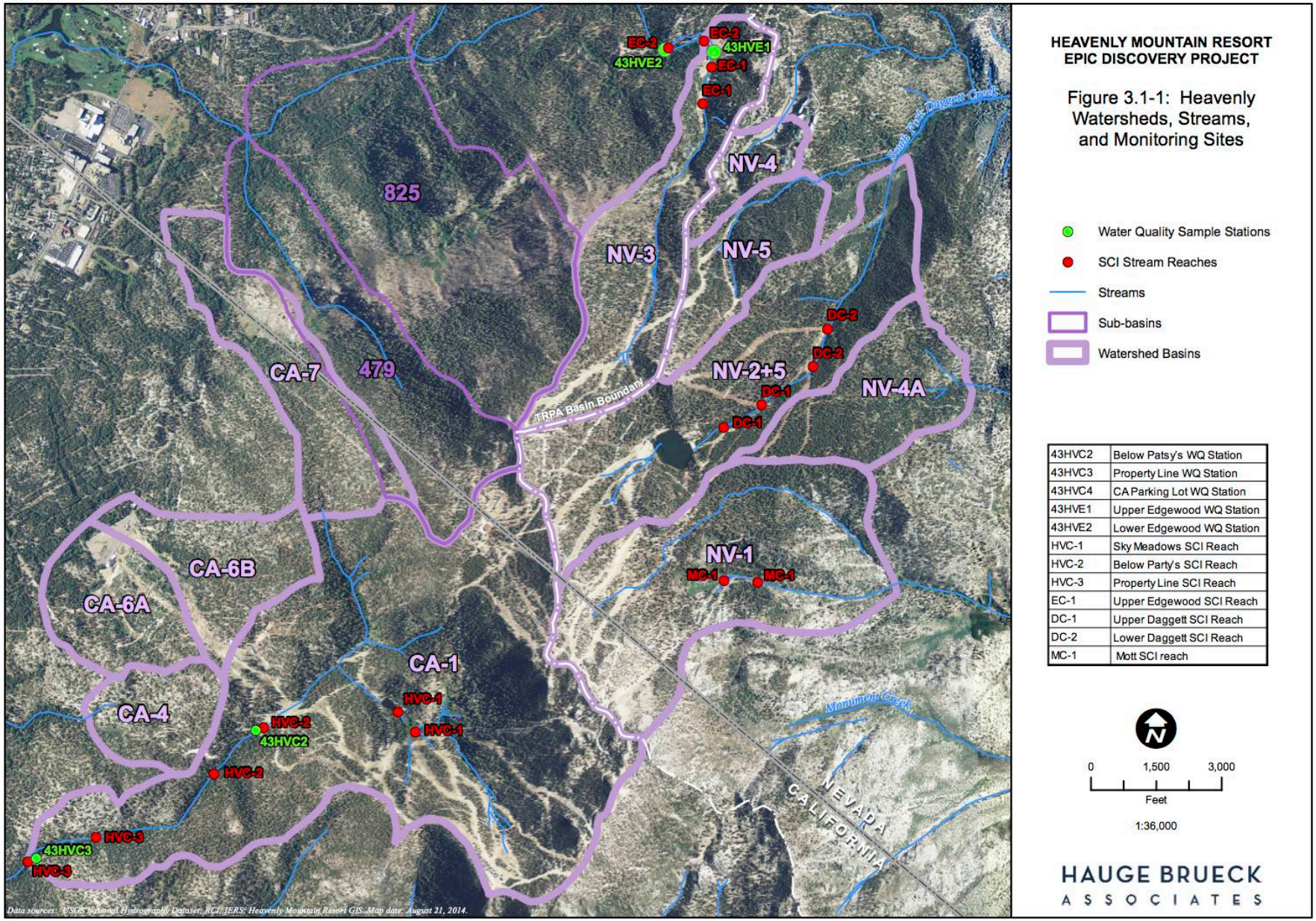
Water quality requirements of streams within the California portion of Heavenly are under the jurisdiction of Lahontan and are governed by the Basin Plan adopted March 31, 1995. The Basin Plan includes water quality objectives that apply to all surface water and groundwater within the California side of the Tahoe Basin.

Heavenly has been subject to water quality regulation by Lahontan since 1970. The Basin Plan provisions specific to Heavenly are implemented through Lahontan Order Number R6T-2003-0032, adopted in 2003 in replacement of Board Order 6-91-36, passed in 1991. The 2003 revisions were made to acknowledge new facilities, uses, and the Total Maximum Daily Load (TMDL) Program for sediment in Heavenly Valley Creek. The 2003 revisions were further amended in May 2011 and in November 2013 under Board Order Number R6T-2003-0032A2, which outlines the current Monitoring Program requirements. The monitoring and reporting requirements are also incorporated into the on-going MPA 07 Environmental Monitoring Program.

Lahontan has authority under the Clean Water Act and the California Water Code to ensure implementation of the Heavenly Valley Creek TMDL in California. The Lahontan Board relies on the three-tier implementation approach outlined in the statewide *Plan for California's Nonpoint Source Pollution Control Program* (California State Water Resources Control Board 2000). Attainment of water quality standards is projected to occur within 20 years of final approval of the TMDL (in 2021).

Heavenly Valley Creek is a tributary of Trout Creek in the southeast portion of the Lake Tahoe watershed. The segment of Heavenly Valley Creek within the boundaries of the Heavenly Mountain Resort (a Forest Service special use permit holder) is Section 303(d)-listed for sedimentation problems related to watershed disturbance for ski resort development and maintenance. The TMDL uses another tributary of Trout Creek as a reference stream, Hidden Valley Creek. This stream has an undisturbed watershed, with streamflow, geology, and vegetation similar to those of Heavenly Valley Creek. Its watershed area is about 87% of the Heavenly Valley Creek watershed area.

Sedimentation of Heavenly Valley Creek is of concern not only because of its impact on instream beneficial uses, but also because of its cumulative contribution to the degradation of Lake Tahoe through addition of sediment and sediment-bound nutrients. Lake Tahoe is on the Section 303(d) list for significant loss of transparency and increased phytoplankton productivity, in violation of water quality standards. Lake Tahoe is a designated "Outstanding National Resource Water" under federal antidegradation regulations. No degradation of such waters can be allowed even where significant socioeconomic benefits would result.


HEAVENLY MOUNTAIN RESORT
EPIC DISCOVERY PROJECT
Figure 3.1-1: Heavenly Watersheds, Streams, and Monitoring Sites
Water Quality Sample Stations
SCI Stream Reaches
Streams
Sub-basins
Watershed Basins
43HVC2 Below Patsy's WQ Station
43HVC3 Property Line WQ Station
43HVC4 CA Parking Lot WQ Station
43HVE1 Upper Edgewood WQ Station
43HVE2 Lower Edgewood WQ Station
HVC-1 Sky Meadows SCI Reach
HVC-2 Below Party's SCI Reach
HVC-3 Property Line SCI Reach
EC-1 Upper Edgewood SCI Reach
DC-1 Upper Daggett SCI Reach
DC-2 Lower Daggett SCI Reach
MC-1 Mott SCI reach
0 1,500 3,000
Feet
1:36,000
HAUGE BRUECK ASSOCIATES
825
479
CA-7
CA-6B
CA-6A
CA-4
CA-1
NV-1
NV-2+5
NV-3
NV-4
NV-4A
NV-5
TRPA Basin Boundary
NEVADA
CALIFORNIA
Monument Creek
South Fork Doggett Creek
EC-2
43HVE2
43HVE1
EC-1
DC-2
DC-1
MC-1
HVC-1
HVC-2
43HVC2
HVC-3
43HVC3
Data sources: USGS National Hydrography Dataset; RCI; IERS; Heavenly Mountain Resort GIS. Map date: August 21, 2014.

Nevada Department of Environmental Protection

Water quality objectives for the Nevada portion of Heavenly (Edgewood, Daggett, and Mott Creeks) are under the jurisdiction of the NDEP and are governed by Nevada Administrative Code (NAC), Chapter 445A.118-445A.225. The NAC contains numeric and narrative water quality objectives. The narrative standards are applicable to all surface water of the State of Nevada and consist mostly of requirements that waters to be free from various pollutants. The numeric standards for common pollutants are subdivided by classes of waters; Class A has the highest quality standards. There are also waterbody specific numeric standards that include both criteria to protect beneficial uses, and non-degradation criteria. Antidegradation is addressed through establishment of Requirements to Maintain existing Higher Quality (RMHQ). RMHQs are set when existing water quality for individual parameters is higher than the criteria necessary to protect the beneficial uses. Existing water quality monitoring data are used as the basis for setting these criteria.

The water quality standards for Edgewood Creek are set forth in *The Lake Tahoe Basin Water Quality Standards Rationale, 1995* and are listed in NAC 445.A.191 (Standards of Water Quality for Lake Tahoe). Nevada State Standards for Class A waters (NAC 445A.124) apply to Daggett Creek, while narrative tributary standards apply to Mott Creek.

Tahoe Regional Planning Agency

Within the Lake Tahoe Basin, the water quality of streams and surface water runoff in both California and Nevada is also subject to TRPA regulation. Heavenly Valley (and Hidden Valley Creek which represents reference conditions for chemical, biological and physical water quality parameters) and Edgewood Creeks are within TRPA's jurisdiction.

The Bi-State Compact requires the Regional Plan to provide for the attainment and maintenance of federal, state, or local water quality standards. Resolution 82-11 sets out numeric, policy and management standards for Environmental Threshold Carrying Capacities (ETCCs) starting with water quality. Resolution 82-11 established Water Quality Threshold Standards for six indicator themes, including: 1) Lake Tahoe pelagic (deep) waters; 2) Lake Tahoe littoral (nearshore) waters; 3) tributaries; 4) direct surface runoff and stormwater discharges to surface waters; 5) stormwater discharge to groundwater; and 6) other lakes (i.e., lakes in the Tahoe Basin other than Lake Tahoe).

Some of these threshold standards are referenced to state standards, or the 1982 Threshold Study Report, rather than being explicitly stated. TRPA's Goals and Policies, Land Use Element, Water Quality subelement, restates the Compact requirements for water quality, the state and federal standard references, and the water quality threshold standards. There are currently two regional water quality goals in the Goals and Policies: Goal #1 covers Lake Tahoe clarity goals; Goal #2 covers other pollutants, which may affect water quality in the Tahoe Basin. The latter presumably covers the Federal, State, and local standards other than those for the water quality Lake Tahoe clarity related thresholds. Code Chapter 60 lists specific discharge standards that are only referenced in 82-11, and the Goals and Policies water quality threshold statements. Code Chapter 16

requires TRPA to keep a list of indicators to be monitored for evaluating the attainment status of thresholds. These are referred to as compliance indicators, and are the main tracking for threshold attainment in the water quality threshold compliance forms.

The applicable water quality criteria are outlined in the following documents:

- Attachment 2 of the Section 208 Plan, as updated in 1988. This document sets forth the tributary standards, standards for discharges to surface waters, and discharges to groundwater.
- *2011 Threshold Evaluation Report*, Chapter 4, which evaluates the six water quality Threshold Standards. At times these standards are different for creeks in California or Nevada and, when more stringent than state standards, are the appropriate water quality standards.
- *Regional Plan for the Lake Tahoe Basin: Code of Ordinances*, Chapter 60, Water Quality, which sets water quality limits for discharges to surface water and groundwater in the Lake Tahoe Region. These limits are consistent with limits set forth in the 208 Plan.

El Dorado County

The goals, objectives, and policies of the 2004 *El Dorado County General Plan* apply to the impact analysis of water resources and water quality of a project. Specific regulatory language appears in the section on Conservation and Protection of Water Resources (Objectives 7.3.1 to 7.3.2).

Alpine County

The goals, objectives, and policies of the *Alpine County General Plan*, as adopted in 1999 and amended in 2005, apply to the impact analysis of wetlands and water resources of a project. Specific regulatory language appears in the Conservation Element Subsection C (GP Goal No. 6 - Improve and maintain the quality of Alpine County's surface water resources in cooperation with the Lahontan and Central Valley Regional Water Quality Control Boards).

Douglas County

The *Douglas County Comprehensive Master Plan 2030* contains Goal 9-5, which states to "maintain high water quality and protect water resources" and Objectives 9-5A-C, which state that the county will coordinate with regional agencies to protect water quality, ensure new development maintains and improves water quality in accordance with adopted clean water regulations, and ensure that water treatment and septic systems will not harm either ground or surface water quality.

3.1-2.2 Environmental Setting

The MPA 07 provides comprehensive descriptions of the portions of the watersheds within Heavenly. Comprehensive Monitoring Reports are produced every 5 years in compliance with the Environmental Monitoring Program required by the MPA 07 mitigation measure 7.5-2 and the Lahontan WDR monitoring and reporting program. Heavenly watershed and stream channel characteristics are described in detail in the following reports and plans that are hereby incorporated by reference:

- *Cumulative Watershed Effects Analysis for the Heavenly Ski Area* (reproduced in Appendix 7 of the MP 96);
- *Heavenly Mountain Resort Environmental Monitoring Program Comprehensive Reports for 1991-2003, 2001-2005 and 2006-2011 (USFS 2004, Entrix 2008; CardnoEntrix 2012);*
- *Heavenly Mountain Resort Environmental Monitoring Program Annual Reports 2012 and 2013* (CardnoEntrix 2013; CardnoEntrix 2014)
- *Lahontan Board Order R6T-2003-0032A2* (Lahontan 2013); and
- *Heavenly Valley Creek TMDL Bioassessment Monitoring Plan* (USFS 2003).

Table 3.1-1 summarizes the physical characteristics of the watersheds that would be affected by the Project (CA-1, CA-7, NV-1, NV-2+5 and NV-3) as derived from the sources listed above.

MPA 07 mitigation measure 7.5-2 was originally developed and implemented by the Forest Service as part of the MP 96 EIR/EIS/EIS. The on-going Environmental Monitoring Program was subsequently included in the MPA 07, and is now jointly overseen by TRPA, Forest Service, and Lahontan.

Table 3.1-2 summarizes conditions from water years 2006 through 2013 and updates the MPA 07 assessment of overall condition and trends, which addressed water years 1996 through 2005, Table 3.1-2 is developed from information presented in the annual monitoring program data and summarizes the water quality, stream condition, effective soil cover, BMP effectiveness, and CWE restoration program implementation (i.e., MPA 07 Mitigation Measure 7.5-1).

Table 3.1-1

Heavenly Watershed Characteristics

Watershed	Drainage Area, acres	Approx. Elev. Change, feet[1]	Approx. Creek Length[2] miles	Water Quality Monitoring Entity & Period	Predominant Soil Types
In-Region - California Side					
CA-1 Heavenly Valley Creek	1,564[3]	3,400	2.7	Forest Service, 1980-1987[5] RCI, 1987-1994[6] Forest Service, 1995-2005, CardnoEntrix 2006-Present	Jobsis-Whittell Rock Outcrop; Bidart Complex; Dagget
CA-7 Unnamed (Gondola)	305	2,850	No creek	No Monitoring	Whittell-Jobsis Rock Outcrop
In-Region - Nevada Side					
NV-3 Edgewood Creek	408	2,390	1.3	RCI, 1991-1994, Forest Service 1995-2005, CardnoEntrix 2006-Present	Whittell-Jobsis Rock Outcrop
Out-of-Region - Nevada Side					
NV-1 Mott Canyon	643[4]	3,380	1.0	No Monitoring	Cohasset-McCarthy Association; Hartless-Neuns Complex; Witefels-Rock Outcrop; Temo-Rock Outcrop
NV-2+5 South Fork Daggett Creek	829	2,830	1.5	RCI 2003-Present[8]	Cohasset-McCarthy Association; Witefels-Rock Outcrop; Temo-Rock Outcrop

Source: Cumulative Watershed Effects for the Heavenly Ski Area, Forest Service, October 1993; MPA 07 EIR/EIS/EIS; 2014 GIS Updates by IERS; Tahoe Basin (2007), El Dorado (1985), and Douglas County (1984) Soil Surveys

1 Within the Heavenly boundary.
2 Length of well-defined creek channel within the Heavenly boundary.
3 A small portion of this watershed lies on the Nevada side of the basin.
4 A portion of this watershed lies within the California side of Heavenly, outside the basin.
5 Flow/Sediment - on-line flow meter connected to suspended sediment meter. Measured up to four times daily. All other constituents collected manually using USGS DH48 method.
6 Flow - HVC2 - Parshall flume, with current meter on low flows; HVC3 measured with Marsh McBirney Flowmeter; Water quality - grab samples
7 Flow-HVE1 and HVE2- Marsh McBirney Flowmeter; Water quality-integrated samples utilizing a USGS DH-48 and Split churn decanter
8 Flow- RCI installed Gauge in 2003 to monitor for water rights; Water quality-none measured

Table 3.1-2

Overall Watershed Conditions at Heavenly Mountain Resort (2006-2013)

Watershed	Water Quality Condition[1]	Stream Condition[2]	Effective Soil Cover[4]	BMP Effectiveness[5]	CWE Implementation[6]	Overall Watershed Condition[7]	Overall Watershed Trend[8]
Heavenly Valley Ck (CA-1)	Good	Fair [3]	Excellent in 2005/Good based on 2011 and 2013 field verifications/Fair-Good based on July 2014 field assessments	Excellent	Excellent	Good	Stable
Gondola Line (CA-7)	N/A	N/A	N/A	Excellent	Excellent	Excellent	Stable
Mott Creek (NV-1)	N/A	Good	Excellent in 2005/Good based on June 2014 field assessments	Excellent	Fair	Good	Stable
Daggett Creek (NV-2+5,4,5)	N/A	Good	Excellent in 2005/No Update Available	Good	Excellent	Good	Stable
Edgewood Creek (NV- 3)	Good	Good	Excellent in 2005/Excellent based on 2011 field verifications	Good	Excellent	Good	Stable

Source: Epic Discovery EIS/EIS/EIR Team 2014

N/A - Not Available, either because the watershed is not drained by a perennial stream channel or in the case of CA-7 and effective soil cover, no data exists

[1] Water Quality based on compliance tables from 2006-2013 in Appendix 3.1-A and data reported in the 2011 CMR (CardnoEntrix 2013)

[2] Channel condition data found in 2006-2011 CMR Report (CardnoEntrix 2013)

[3] Benthic Macroinvertebrate (BMI) monitoring results and conclusions (Lahontan 2014) (Appendix 3.1-B) identified BMI conditions as Poor.

[4] Effective soil cover data found in the 2006- 2011 CMR Report (CardnoEntrix 2013)

[5] BMP Effectiveness data found in the 2006-2011 CMR Report (CardnoEntrix 2013) and updated to include 2012 and 2013 annual monitoring results. See RCI Technical Memorandum (2014) in Appendix 3.1-C.

[6] CWE Restoration Program requirements are based on MPA 07 Phasing and Capital Projects Implemented through 2013; if a Capital Project was not constructed, then associated CWE restoration projects were not required. CWE Implementation was determined by cross reference of Annual CWE Project lists with Table 4 of Appendix D of the 2007 MPA EIR/EIS/EIS and verified by annual monitoring and reporting, attached in Appendix 3.1-D (HBA and IERS Staff)

[7] Ratings were determined as based on Sections 2.1 -2.5 of the 1991-2003 CMR (USDA Forest Service 2004)

[8] Overall trend considered as 2006-2011 CMR, as updated by 2012 and 2013 Annual Reports and as compared to conditions reported in the MPA 07

The components of Table 3.1-2 are described in the following subsections.

Water Quality Monitoring. Currently, the Monitoring Program includes monthly water quality monitoring at six stations illustrated in Figure 3.1-1: CA Parking Lot, Below Patsy's, Property

Line, Hidden Valley, Upper Edgewood and Lower Edgewood). Weekly sampling occurs during the spring snowmelt period. The following primary list of constituents is monitored at each of the receiving water sampling stations:

- Discharge;
- Turbidity;
- Suspended Sediment;
- Total Nitrogen;
- Total Phosphorus; and
- Chloride.

The period of record for this analysis is water years 2006-2013. Table 3.1-2 water quality condition status ratings are based on the following criteria:

Excellent: All water quality parameters meet State and Tahoe Basin standards; water quality concentrations for all parameters are decreasing

Good: Most water quality parameters meet State and Tahoe Basin standards; water quality concentrations for most parameters are decreasing compared to baseline data, while others are stable

Fair: Some water quality parameters meet State and Tahoe Basin standards; water quality concentration for some parameters are decreasing compared to baseline, while others are stable

Poor: No water quality parameters meet State and Tahoe Basin standards; water quality concentrations are increasing for some parameters

Stream Condition Monitoring. The Monitoring Program includes riparian and channel condition monitoring, as well as benthic macroinvertebrate (BMI) monitoring. The monitoring objectives include: determining which, and by how much, various creek parameters fluctuate between monitoring periods; evaluating the impacts of Heavenly management practices on riparian system health; and for Heavenly Valley Creek determining if TMDL criteria are being met. Chapter 8 of the 2006-2011 CMR (CardnoEntrix 2012) contains the monitoring objectives, methods, and reach descriptions.

In 2003, the Forest Service made a number of recommendations to improve channel condition monitoring. These recommendations are reflected in the Riparian Conditions Monitoring Plan developed by ENTRIX (now CardnoEntrix) in 2005. The revised plan was implemented in 2006, 2009 and most recently in 2011. Channel condition monitoring is a two year on and two year off schedule, timed to coincide with the BMI monitoring. Following restoration completed in 2007, stream condition monitoring occurred annually along the Edgewood Creek reaches from 2008 to 2011.

The stream condition monitoring aids in the interpretation of the BMI data. BMI monitoring occurred in 2006, 2007, 2010, 2011, and will occur again in the summer of 2014 and 2015. Results from 2010 and 2011 monitoring have been released and Index scores are presented for watershed CA-1 (Lahontan 2014) in Appendix 3.1-B.

Table 3.1-2 stream condition status ratings are based on the following criteria:

Excellent:	All channel conditions are stable or improving
Good:	Most channel conditions are stable or improving
Fair:	Some channel conditions are stable or improving
Poor:	Most channel conditions are not stable or improving

Effective Soil Cover Monitoring. The Effective Soil Cover Monitoring Program included soil cover monitoring to determine requirements and effectiveness of various soil covers under different slopes and conditions in controlling sheet, rill, gully and channel erosion. Monitoring examines the effectiveness of past and current projects. Soil cover monitoring conducted from 1995 to 2003 was based on the use of random transects at elevations above 7,000 feet; the Forest Service recommended that the measurements be discontinued because the tests were too time intensive and did not support monitoring objectives. A new protocol was developed that combined the California Native Plant Society's (CNPS) Vegetation Rapid Assessment Protocol (VRAP) and the establishment of permanent photo points. The method was supported by an aerial survey, and Heavenly and the Forest Service agreed to share the cost of an over-flight. An infrared aerial flyover of Heavenly Mountain Resort produced a 1:8,000 resolution infrared aerial photo of the entire mountain and was used along with Geographic Information Systems (GIS) and field verification (i.e. ground-truthing) to produce an accurate picture of the soil cover at Heavenly. The VRAP method was augmented in 2009 with the establishment of permanent photo points to better track variability over time. Photo points established in 2009 established a baseline reference, though not all of the sites were accessible. Effective soil cover status is brought forward from 2005 conditions and updated when data is available.

Table 3.1-2 effective soil cover status ratings are based on the following criteria:

Excellent:	Effective soil cover approaching 70%; slopes stable with no evidence of rilling
Good:	Effective soil cover approaching 50%; slopes stable with little evidence of rilling
Fair:	Effective soil cover at least 30%; slopes have moderate erosion with evidence of rilling
Poor:	Effective soil cover less than 30%; slopes have heavy erosion with evidence of gullying

The Monitoring Program was amended in November 2013 under Board Order Number R6T-2003-0032A2 to update effective soil cover monitoring with an erosion-focused rapid assessment process described in the *Watershed Management Guidebook* (Drake and Hogan 2012). The methodology was piloted in watershed CA-1 and focuses on identifying primary sources of erosion ("hotspots") through a GIS flow accumulation mapping exercise followed by on-the-ground assessment and prioritizing treatments within a watershed context. Erosion hot spot identification and ranking criteria include: erosion risk, active erosion, active deposition, proximity to stream, connectivity to stream and stream environment zone, watershed priority, and operational priority. Monitoring results are available and discussed below for watersheds CA-1 and NV-1.

BMP Effectiveness Monitoring. Heavenly implements Best Management Practices (BMP) to minimize soil erosion and protecting water quality under various conditions. The BMPs are modeled after Region 5's Best Management Practices Effectiveness Program (BMPEP) protocols (USDA Forest Service 2002). Permanent BMPs were installed for existing facilities and new projects across Heavenly Mountain Resort during the 2006-2013 monitoring period.

There were 346 separate permanent BMP evaluations completed at 117 sites. The average number of inspections is 43 per year (ranged from 30-70). Evaluations are typically conducted at 1, 3, 6 and 9-year intervals following project completion. BMP effectiveness categories include: source control, revegetation, slope protection, infiltration, ponding and hazardous materials. Appendix 3.1-C summarizes the permanent BMP implementation and effectiveness results for the period of record. Table 3.1-2 status ratings are based on the following criteria:

Excellent: 90% of BMPs implemented correctly and functioning effectively; no evidence of sediment leaving the site and entering the stream channel

Good: 75% to 90% of BMPs implemented correctly and functioning effectively; some evidence of sediment leaving the site, but no sediment reaching the stream channel

Fair: 50% to 75% of BMPs implemented correctly and functioning effectively; some evidence of sediment leaving the site, some sediment reaching the stream channel

Poor: Less than 50% of BMPs implemented correctly and functioning correctly; evidence of sediment leaving the site, excessive sediment reaching the stream channel

CWE Restoration Program Implementation. The Cumulative Watershed Effects (CWE) Restoration Program is implemented in fulfillment of MPA 07 mitigation measure 7.5-1 of the MPA 07. Project implementation and on-going ski run and road maintenance that occurred between 2006 and 2013 is reported in table format in Appendix 3.1-D. Table 3.1-2 status ratings are based on the following criteria:

Excellent: All CWE projects implemented and maintained according to CWE timeline

Good: All CWE projects implemented according to CWE timeline; but some project components need reestablishing (for example, reseeding is necessary on some revegetation sites)

Fair: Only partial implementation of CWE projects has been achieved according to timeline; or CWE projects are one year behind schedule

Poor: No CWE projects have been implemented, or CWE projects are two years or more behind schedule

Overall Watershed Condition. Overall watershed condition is a qualitative evaluation that considers water quality, effective soil cover, channel condition and BMI scores (when available).

Overall Watershed Trend. Trend evaluations gauge overall watershed condition to determine if ski area management activities are improving or degrading water quality and ecological health. The evaluations in Table 3.1-2 compare the analysis in the MPA 07 to the conditions

summarized in the 2006-2011 CMR, as updated by the 2012 and 2013 annual monitoring reports. The ratings are as follows:

Much Improved:	Watershed condition (as measured by water quality, effective soil cover, channel condition, and BMP and CWE project implementation) greatly improved compared to 2005 conditions; all watershed components have improved
Improved:	Watershed condition improved compared to 2005 conditions; most watershed components have improved
Stable:	Watershed condition has remained more or less static as compared to 2005 conditions; some watershed components may have improved while others may have degraded
Degenerating:	Watershed conditions have degraded; several watershed components have degraded while none have improved as compared to 2005 conditions

3.1-2.3 Description of Existing Watershed Conditions

The MPA 07 includes a description of each watershed in Heavenly. This section augments that description with the results of the on-going Environmental Monitoring Program, as relevant to the Project.

Watershed CA-1 - Heavenly Valley Creek

Within the Heavenly Valley Creek watershed (CA-1), the Proposed Project and Alternative 2 would have a maximum of 2.1 acres of permanent disturbance, and 4.5 acres of temporary, construction-related disturbance. Alternative 1 would have a maximum of 2.3 acres of permanent disturbance and 6.8 acres of temporary, construction-related disturbance. Project components, including ziplines, hiking and maintenance trails, parking areas, coasters, and ropes courses, would be located in the area of the Top of the Gondola with low to very low hydrologic connectivity and the Sky Basin with moderate to high hydrologic connectivity to Heavenly Valley Creek, as illustrated in Appendix 3.1-E).

Water Quality. The designated beneficial uses of Heavenly Valley Creek and its tributaries are Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), Groundwater Recharge (GWR), Water Contact Recreation (REC-1), Non-Contact Water Recreation (REC-2), Commercial and Sportfishing (COMM), Cold Freshwater Habitat (COLD), Wildlife Habitat (WILD), Rare and Endangered Species Habitat (RARE), Migration of Aquatic Organisms (MIGR), and Spawning of Aquatic Organisms (SPWN). The most pertinent beneficial uses for Heavenly Valley Creek are freshwater habitat and wildlife habitat as well as non-contact recreation. Chapter 2 and Section 5.1 of the Basin Plan include definitions of each of these uses.

Hidden Valley Creek is the selected reference stream for Heavenly Valley Creek for the water quality portion of the *Heavenly Mountain Resort Environmental Monitoring Program* and for the *Heavenly Valley Creek TMDL Bioassessment Monitoring Plan*. This station is monitored at the same frequency as Heavenly Valley Creek and serves as a reference for baseline conditions for the Property Line monitoring station. With the exception of the RARE use, Hidden Valley Creek has the same designated beneficial uses as Heavenly Valley Creek. These are the beneficial uses

of Trout Creek, which apply upstream under the "tributary rule". The Basin Plan states on page 3-13 that: "Where objectives are not specifically designated, downstream objectives apply to upstream tributaries."

The TMDL for Heavenly Valley Creek was established in 2002 at 58 tons/year of total suspended sediment (TSS) based on a five-year rolling average. This value is calculated by weighing the number of days between sample collections and multiplying this value by the discharge value recorded to report the calculated weighted flow. Laboratory measured values for suspended sediment are then multiplied by the weighted flow numbers and summer and a final unit conversion is applied to report TSS as tons/year. Table 3.1-3 shows a comparison of annual suspended sediment loading at the Heavenly Property Line and Hidden Valley monitoring stations for water years 2006 to 2013. Variability in annual loading is influenced by precipitation regime and resultant discharge. The period from 2007 through 2010 was characterized by below average precipitation and low stream flow, while 2006 was an above average precipitation year with high stream flow and water year 2011 was the wettest year in the Heavenly monitoring history (1991-2013). Suspended sediment values measured in 2011 are suspected to be attributable to mobilization of fine sediment that had settled along the stream bank and bed throughout the four to five year period of low streamflow. As temperatures rose in June 2011, discharge tripled in two weeks time and then doubled within another two weeks, resulting in the first significant flow since 2006 and an extremely high suspended sediment sample collected June 22, 2011 that is reflected in the 2011 annual suspended sediment value in Table 3.1-3 (CardnoEntrix 2013).

Table 3.1-3

Suspended Sediment Values for Heavenly Valley and Hidden Valley Creeks

Year	Average Discharge Heavenly Valley Creek (cfs)	Heavenly Valley Creek (Tons/Year)	Average Discharge Hidden Valley Creek (cfs)	Hidden Valley Creek (Tons/Year)
2006	4.3	42.6	4.41	37.2
2007	0.76	1.3	1.18	3.4
2008	0.55	0.6	1.11	1.9
2009	0.46	0.5	0.81	1.9
2010	0.47	21.6	0.78	5.8
2011	5.47	118.6	7.05	60.9
2012	1.09	1.7	1.67	3.4
2013	0.72	1.0	1.42	3.5
5-Year Rolling Average (2009-2013)		**28.7**		**15.1**

Source: CardnoEntrix 2014

The 2010 TMDL Implementation Tracking Status Report (Lahontan 2010) noted that Heavenly Valley Creek was in compliance with the sediment target, and since 2010, the five-year rolling average has been nearly half of the Lahontan TMDL standard value. Note that water year 2011 was an above average precipitation year and had the highest flows recorded during the period of record. During low flow years, Heavenly Valley Creek's TSS values are less than high flow years. This trend is observed for Hidden Valley Creek TSS values well (CardnoEntrix 2014). The state standard for TSS is an 90th percentile value of 60 milligrams/Liter (mg/L). Heavenly and Hidden Valley Creeks are in compliance with the TSS state standard throughout the period of record.

The state annual standard for Total Nitrogen (TN) is the sum of the total nitrate, total nitrite, and total Kjeldahl nitrogen. For water year 2006 through 2013, a violation occurred in 2010 while the standard was met in other water years. The violation was recorded because although the standard was also exceeded at the Hidden Valley Creek reference station, TN concentrations measured 42% percent higher at the Property Line station.

For water year 2006 through 2013, the state standards for Total Phosphorus (TP), and Total Iron were exceeded each year for both Heavenly Valley Creek stations and the Hidden Valley Creek reference station. Total Iron results were highly variably at the Property Line and Hidden Valley monitoring stations. TP annual averages in 2006 were the same for both stations. Because TP annual averages for Hidden Valley Creek exceeded those reported for Property Line station in 2007, 2008, 2009, 2012, and 2013, ranging between 13 to 39% higher, violations were not recorded. However, 2010 and 2011 TP annual averages at Property Line exceeded those reported for Hidden Valley Creek by 52 and 24%, respectively. Violation of the annual average standard was recorded in 2010 and 2011. Violations of the TN and TP annual average standard were recorded in 2010 and 2011 at the Below Party's station, because annual average TN measured 45% and 39% higher and annual average TP measured 67% and 76% higher than the reference station.

Chloride concentrations have exceeded the state standard over the past eight monitoring years While Chloride readings are above the state standard at Hidden Valley Creek, annual averages at the Property Line station ranged between 35 and 74% higher that those reported for Hidden Valley Creek. The exact cause for these increased Chloride concentrations are under investigation by Heavenly and Lahontan; winter application of salts is one plausible cause (CardnoEntrix 2014). New summer uses would not require application of salts.

There are high risk areas of potential impacts to water quality from non-point sources within the resort, and some aspects of the resort operations are likely the source of periodic exceedances of constituent concentrations. Ongoing monitoring and maintenance will continue to identify and address high risk areas.

Although there are periodic exceedances of constituent concentrations, water quality is rated as Good for CA-1, as based on compliance for the Heavenly Valley Creek TMDL five-year rolling average and annual average standards reported during the period of record. Conclusions are supported by hydrograph comparisons in annual reports and compliance comparisons (Appendix 3.1-A) with the Hidden Valley Creek reference site.

Water quality monitoring requirements for the Sky Meadows station (water quality station 43HVC1A through water year 2006) were discontinued in response to recommendations of 2006 Annual Monitoring Report (ENTRIX 2007), which "recommended that Sky Meadows be excluded from future monitoring protocol. The data has shown that the water quality is not adversely affected by resort operations. Especially considering Heavenly's proposal to decrease the impact on this reach by decommissioning the Sky Deck restaurant facilities, water quality concerns are minimal at this site. Excluding this site from future water quality monitoring will allow the program to focus on more highly impacted sites (page 2-17)." Information has changed since this action. This decision will be revisited as part of updating the Environmental Monitoring Plan in 2015 through the Lahontan waste discharge requirement (WDR) amendment process.

Stream Condition. Three reaches along Heavenly Valley Creek are monitored: Sky Meadows (HVC-1), Below Patsy's (HVC-2), and Property Line (HVC-3). The 2006-2011 CMR concludes improved and consistent channel conditions for Sky Meadows as compared to Upper Hidden reach and the Property Line as compared to the Lower Hidden reach. No reference reach is studied for the Below Patsy's reach, but physical habitat parameters have similar year-to-year trend, the habitat types, pool numbers and dimensions are stable, and stream shading is good. Project components would be located in the Sky Basin portion of the CA-1 watershed and therefore existing conditions for Sky Meadows are further described below.

As reported in the CMR, Sky Meadows and Upper Hidden have similar channel geometry with similar trends over time of some lateral and vertical changes in channel position, which are consistent with normal dynamics of a stable meadow channel. The morphology of Sky Meadows cross-sections remained generally similar from 2006 to 2011. The reach is in a meadow and the upstream cross-section shows signs of sediment deposition as of 2011. This cross-section is located where the stream slope decreases as it enters the lower gradient meadow, dissipating energy and allowing sediment deposition. Little to no bed elevation change was recorded at the two downstream cross-sections. Throughout the meadow there are minor bed slope changes and the riffle and pool boundaries are dynamic overtime; one year a permanent cross-section might be located at a riffle while in another year it is located in a pool. Minor bed elevation changes from scour and fill are typical for meadow streams. Some lateral mitigation of the channel, whereby bank erosion on one side of the channel is offset by sediment fill in the other, is also typical for alluvial meadow systems.

In 2011, the Sky Meadow reach displayed higher bank stability than the Upper Hidden reference reach (97 compared to 40%), but had fewer large woody debris (18 compared to 50 LWD count) and less stream shading (29 compared to 51%). Aquatic habitat distribution was similar. Mean stream shading for Sky Meadows reach changed from 37% in 2006 to 29% in 2011, which is within the range of crew subjective variability. Streambank angle is comparable between the two sites with no reported change in streambank angle measured between 2006 and 2011.

Pool tail fines is measured along with residual pool depths at each identified pool in each reach with the objective of quantifying the percentage of sediment less than 2 millimeters (Silt and clay size material) on the pool tail substrate. In 2011, pool tail fines ranged from 80% in the Sky Meadows reach to 12% in the Below Patsy's reach, with 61% pool tail fines reported at the Property Line reach. Pools tail fines at Upper Hidden and Lower Hidden reaches measured 62% and 13%, respectively.

Particle size distribution measurements were conducted at the four riffles in each reach that were also sampled for benthic macroinvertebrates (BMI) during the previous sampling years. Median particle diameter class for Sky Meadows and Upper Hidden reaches remained medium gravel (11-16 mm) between 2006 and 2011.

The Property Line and Lower Hidden reaches display similar and consistent channel widths and with/depth ratios. Although differences are noted between cross-sections, both reaches have cross-sections with similar ranges and parallel trends for channel area, stream bank stability, aquatic habitat, and shading. Large woody debris is abundant at both reaches, but represents one area of variability between the two reaches.

Monitoring results for the Below Patsy's reach conclude stable habitat types, pool numbers and dimensions, good stream shading, stable banks and consistent channel geometry. Some variation is pool tail fines and large woody debris abundance is reported between years. This reach does not have a comparable reference reach.

Stream physical habitat condition based on the above metrics is rated as Good for CA-1. However, a conflict exists between this conclusion and the results of biological stream condition monitoring conducted within the Sky Meadows reach of Heavenly Valley Creek, as discussed further below.

Benthic Macroinvertebrate. TMDLs for suspended sediment were adopted by Lahontan in January 2001, and approved by USEPA in Sept 2002. The adopted "desired condition" for Heavenly Valley Creek is: "Improving trends in benthic invertebrate community metrics over time, approaching conditions in Hidden Valley Creek." BMI are sensitive to changes in water chemistry, temperature, and the physical habitat and have been demonstrated to be useful as indicators of water quality and habitat condition. From 2001-2011, BMI samples were collected and analyzed according to the methods prescribed at the time by the Forest Service and Lahontan; these methods have changed over time, which can complicate trend analysis. The results were evaluated to assess the biotic condition and trends at the three Heavenly Valley Creek reaches and the Lower Hidden Valley Creek reference reach.

Bioassessment scores presented in Table 3.1-4 are calculated using the Eastern Sierra Index of Biological Integrity (ESIBI) (Herbst and Silldorff 2009) and the draft California Stream Condition Index (CSCI), which is currently being prepared for publication by California Department of Fish and Wildlife (CDFW).

Tables 3.1-5 and 3.1-6 define the ESIBI and CSCI thresholds, respectively, for comparison to Heavenly Valley Creek bioassessment scores presented in Table 3.1-4. Scores that fall into the range of "impaired" for the ESIBI, and "likely altered" to "very likely altered" for CSCI, are highlighted in bold in Table 3.1-4.

Table 3.1-4

Bioassessment Scores for Heavenly and Hidden Valley Creeks

Sample Year	Sample Date	HVC-1 Heavenly Valley "Sky Meadows"		HVC-2 Heavenly Valley "Below Patsy's"		HVC-3 Heavenly Valley "Property Line"		LHC-1 (Lower) Hidden Valley (control/reference)	
		ESIBI	CSCI	ESIBI	CSCI	ESIBI	CSCI	ESIBI	CSCI
2001 -USFS	Jul-01	**35.6**	**0.56**	**49.4**	**0.74**	**53.9**	0.77	75.2	0.92
2001 -SNARL	Jul-01	n/a	n/a	n/a	n/a	84.2	1.08	93	0.95
2002 -SNARL	Jul-02	n/a	n/a	n/a	n/a	75.3	0.87	96.8	1.15
2002 - USFS	Jul-02	**37.9**	**0.69**	**53.9**	0.91	**51.1**	0.72	75.2	1.08
2003	Jul-03	**49.6**	0.84	**56.6**	0.85	**48.7**	0.93	78.2	1.06
2006	Sep-06	**55.3**	0.92	**52.2**	0.95	69.1	1.02	80.6	1.15
2007	Aug-07	**23.6**	**0.44**	67	0.98	74.7	1.1	93.3	1.04
2010	Aug-10	**36.8**	0.74	**55.2**	0.99	80.7	0.9	94.6	1.08
2011	Aug-11	**49.8**	**0.69**	75	0.86	83.5	1.02	87.8	0.86
2011	Oct-11							87.8	0.99

Source: Table 2 of Appendix 3.1-B (Lahontan 2014)

n/a: not available, BMI data not collected

Table 3.1-5

Eastern Sierra Index of Biological Integrity (IBI) Thresholds

Supporting (Unimpaired)			Impaired	
Acceptable		Intermediate supporting but uncertain	Partially-supporting	Not supporting
>89.7	89.7–80.4	80.4 – 63.2	63.2 – 42.2	<42.2
A	B	C	D	F
Very good	Good	Fair	Poor	Very poor
Good		Fair	Poor	

Source: Herbst and Silldorf 2009 (Lahontan 2014)

Table 3.1-6

California Stream Condition Index (CSCI) Thresholds

Index	Very Likely Intact (>=0.50)	Likely Intact (0.30 to 0.50)	Possibly Altered (0.10 to 0.30)	Likely Altered (0.091 to 0.10)	Very Likely Altered (<0.01)
CSCI	>1.00	1.00 – 0.92	0.91 – 0.79	0.78 – 0.63	0.62 – 0.00

Source: Drs. Andrew Rehn and Peter Ode (Lahontan 2014)

The results for 2001 through 2011 were first available for review in early 2014. Pending publication of the CSCI by the CDFW, calibration of the Tahoe IBI according to published CSCI scores (Dowd and Stubblefield 2013), and pending interpretation of the results in light of the Environmental Monitoring Program and provisions for corrective action, this settings section provides an initial assessment of the data.

There are sometimes conflicting results between the two metrics analyzed, but metrics generally portray a fairly clear picture of biological condition within these four reaches. Using the thresholds discussed above, biotic condition at the Sky Meadows reach is consistently impaired according to the ESIBI, and likely altered according to the CSCI. Biotic condition at the Below Patsy's reach shows conflicting results, which sometimes falls into the impaired range according to the IBI, but scores are consistently intact according to the CSCI. Biotic condition at the Property Line reach has scored unimpaired and intact since 2006. Biological condition at the Hidden Valley Creek control reach is has always scored unimpaired and intact.

The impaired biotic condition result in Sky Meadows was unexpected because the physical habitat characteristics measured for the Sky Meadows reach are reportedly Stable and within the range of natural variability (CardnoEntrix 2013) and water quality parameters are generally good as compared to reference conditions (Appendix 3.1-A). The Sky Meadows station water quality monitoring requirements were discontinued after the 2006 water year, while bioassessment and SCI monitoring continues for the Sky Meadows reach.

Forest Service Region 5 and TRPA staff provided an initial screening of the taxonomic data from 2001, 2006, 2010 and 2011, specifically looking at fine-sediment sensitive taxa such as *Rhithrogena, Doroneuria, Dolophilodes, Epeorus, Ironodes, and Yoraperia* (Relyea et al. 2012). The initial assessment found that the Sky Meadows reach had the lowest abundance of fine-sediment sensitive taxa (i.e., fine-sediment intolerant) compared to the Below Patsy's and Property Line reaches and the Hidden Valley reference reach, which would support a conclusion of impairment due to fine sediment deposition.

Based on the limited screening conducted, it is not certain that fine sediment is the primary or only source of impairment in the Sky Meadows reach. Several of the fine-sediment intolerent taxa screened are also intolerant to stream temperatures greater than 13 degrees Celsius. BMI data was collected and analyzed in 2009 and 2010 from 85 sites located within 29 watersheds of the Lake Tahoe Basin (*Stream Condition Assessment of the Lake Tahoe Basin in 2009 and 2010*

using the River Invertebrate Prediction and Classification System (RIVPACS) (Dowd and Stubblefield 2013). Habitat analysis of "marginal" or "impaired" sites in this report identified possible causative stressors of the degraded conditions. For higher elevation low gradient sites, like the Sky Meadows reach, very open canopy conditions with limited riparian shade are typical. Open meadow areas are typically more exposed to solar radiation and higher stream temperatures than stream segments with shade created by riparian shrubs and trees. Thick riparian canopy, in addition to providing shade, also drop leaf litter providing a base for the BMI food web. Streams with very low flows, like Sky meadows can experience elevated stream temperatures and low dissolved oxygen levels. Additional data collection and interpretation completed as part of the ongoing Environmental Monitoring Program is warranted to further identify potential habitat stressors that may be contributing to impaired biotic condition in the Sky Meadows Reach. This will inform adaptive management strategies, and track improvement in both physical and biological metrics. Recommendations for additional data collection is described further in the analysis for Impact WATER-C1 in Section 3.1-4.4 of this chapter.

Taken as a whole, the results reported in Table 3.1-4 and Appendix 3.1-B suggest that the instream biotic condition of the Sky Meadow reach is Poor, and the biotic condition of the Below Patsy's and Property Line reaches is generally Fair to Good, but not yet "approaching conditions in Hidden Valley Creek" as called for in the Heavenly Valley Creek suspended sediment TMDL (Lahontan 2014).

While the physical stream condition and water quality is generally Good (Table 3.1-3), the biotic data do not yet indicate an improving trend. Bioassessment monitoring will continue to be an essential component of Environmental Monitoring Program to assess future conditions and determine the need for further corrective action.

<u>Effective Soil Cover.</u> In 2005, effective soil cover was rated as Excellent for CA-1. In 2013, an erosion-focused rapid assessment process was tested in the CA-1 watershed below Sky Reservoir for identification of erosion "hot spots." Twenty-five (25) hot spots in the CA-1 watershed were identified and photo documentation taken. Three treatment projects (Lower Powderbowl Slope, Lower Pioneer Poma Trail and Maggies Trail) that addressed eight (8) hot spots were completed in 2013. Monitoring results for the three treatment projects indicate measurable improvement in erosion resistance. Seven treatment projects are scheduled for 2014. The July 2014 erosion assessment of the upper CA-1 watershed above the Sky Reservoir identified 23 hot spots, 16 of which have high hydrologic connectivity to the stream channel (Appendix 3.1-E). Effective soil cover is rated as Fair-Good.

<u>BMP Effectiveness.</u> Between three to 37 BMP evaluations were completed each year in CA-1. On average 90.5% of the inspections concluded that permanent BMPs were fully implemented and fully effective. BMP effectiveness is rated as Excellent for CA-1.

<u>CWE Program Implementation.</u> A total of 38 CWE restoration projects were identified by MPA 07 mitigation measure 7.5-1 for implementation in CA-1. Of the 38 total projects, 18 projects were required for completion between 2006 and 2013 and 18 projects or 100% have been completed. CWE program implementation is rated as Excellent for CA-1.

Overall Watershed Condition and Trend. Overall watershed conditions and trend is rated as Good and Stable for CA-1. However, as noted above, monitoring does indicate the need to address the impaired condition indicated by biotic monitoring in Sky Meadows.

Watershed CA-7 - Unnamed Creek – Gondola

Within the CA-7 watershed, the Project would have a maximum of 0.04 acres of permanent disturbance and 0.3 acres of temporary, construction-related disturbance associated with ziplines, maintenance trails and the Gondola evacuation route. Hydrologic connectivity is extremely low in this portion of the CA-7 watershed.

BMP Effectiveness. Less than ten inspections were completed in CA-7 during the period of record, but evaluations concluded that permanent BMPs were fully implemented and fully effective. BMP effectiveness is rated as Excellent for CA-7.

CWE Program Implementation. A total of two (2) CWE restoration projects were identified by MPA 07 mitigation measure 7.5-1 for implementation in CA-7. One of the two projects was required for completion between 2006 and 2013 and this project was completed. CWE program implementation is rated as Excellent for CA-7.

Overall Watershed Condition and Trend. Overall watershed conditions and trend is rated as Good and Stable for CA-7.

Watershed NV-1 - Mott Creek

Within the Mott Creek watershed (NV-1), the Project would have a maximum of 2.7 acres of permanent disturbance, and 7.1 acres of temporary, construction-related disturbance. This activity would primarily occur in a portion of the watershed with low hydrologic connectivity to Mott Creek channel (Appendix 3.1-F).

Stream Condition. Mott Creek is located on the Nevada side of Heavenly Mountain Resort and is part of the Carson River drainage. There are two main tributaries of this Creek located within Heavenly's boundaries. These ephemeral drainages are on very steep slopes (greater than 50 percent) and begin to flow as perennial streams at an elevation of approximately 8,400 feet MSL and join at an elevation of about 6,690 feet MSL.

Channel morphology and gradients at Mott Creek (MC-1) cross-sections are relatively consistent over time. Net scour/fill data indicates that fill has occurred at the three reach cross-sections. Large wood debris counts have increased since 2006. No profile steepening from downcutting, knickpoint establishment, or migration is apparent. In 2006 all stream banks were rated as stable. In 2009, 77% of stream banks were rated as stable. Bank stability ratings collected in June 2014 report 79% of stream banks were stable.

The 2006-2011 CMR concludes uncertain trends for Mott Creek. Other than minor changes between 2006 and 2009, the Mott Creek reach appears to be a stable channel that is unaffected by resort management activities.

Stream condition is rated as Good for NV-1.

Effective Soil Cover. Effective soil cover was rated as Excellent for NV-1 in 2005. No updates were available for 2006 through 2013. June 2014 erosion assessments by IERS, HBA and Heavenly Staff identified areas for improved effective soil cover and drainage and the opportunity to remove and restore an existing assess road. Appendix 3.1-F details these areas, the erosion risk, and hydrologic connectivity to a stream or SEZ. Overall effective soil cover is rated as Good.

BMP Effectiveness. Less than ten inspections were completed in NV-1 during the period of record, but evaluations concluded that permanent BMPs were fully implemented and fully effective. BMP effectiveness is rated as Excellent for NV-1.

CWE Program Implementation. A total of six (6) CWE restoration projects were identified by MPA 07 mitigation measure 7.5-1 for implementation in NV-1. Of the six (6) total projects, two (2) projects were required for completion between 2006 and 2013. One of the two projects has been fully completed. The Skyline Trail/Dipper Knob roadway/trail improvement project was not a CWE Restoration Program required project but was implemented in 2008 to increase erosion resistance of the roadway/trail and stabilized side slopes in both CA-1 and NV-1. CWE program implementation is rated as Fair for NV-1.

Overall Watershed Condition and Trend. Overall watershed conditions and trend is rated as Good and Stable for NV-1.

Watershed NV-2+5 - South Fork Daggett Creek

Within the South Fork Daggett Creek watershed (NV-2+5), the project would have a maximum of 3.1 acres of permanent disturbance, and 4.8 acres of temporary, construction-related disturbance. This activity would be primarily within the portion of the watershed draining to East Peak Reservoir and above the Daggett Creek channel.

Stream Condition. The 2006-2011 CMR concludes uncertain trends for Daggett Creek. Channel width, habitat types, and sediment sizes have remained consistent and bank stability and some aspects of habitat quality have improved. Stream condition is rated as Good for NV-2+5.

Effective Soil Cover. Effective soil cover is rated as Excellent for NV-2+5.

BMP Effectiveness. Between three to 12 evaluations were completed each year in NV-2+5. On average 66.6% of the inspections completed in NV-2+5 concluded that permanent BMPs were fully implemented and 83% concluded that permanent BMPs are fully effective. BMP effectiveness is rated as Good for NV-2+5.

CWE Program Implementation. A total of 11 CWE restoration projects were identified by MPA 07 mitigation measure 7.5-1 for implementation in NV-2+5. Of the 11 total projects, three (3) projects were required for completion between 2006 and 2013 and three (3) or 100% have been completed. CWE program implementation is rated as Excellent for NV-2+5.

Overall Watershed Condition and Trend. Overall watershed conditions and trend is rated as Good and Stable for NV-2+5.

Watershed NV-3 - Edgewood Creek

Within the Edgewood Creek watershed (NV-3), the Project would have a maximum of 0.2 acres of permanent disturbance, and 0.2 acres of temporary, construction-related disturbance from the construction of the Panorama Trail. This activity would have low hydrologic connectivity to Edgewood Creek channel. The Project would also result in new permanent disturbance and temporary, construction-related disturbance in two previously unstudied watersheds that are tributary to Edgewood Creek. EDGE-1 is 479 acres and EDGE-2 is 825 acres and both watersheds lie between CA-7 and NV-3, as shown on Figure 3.1-1. Project activities, including the Mid-Station Canopy Tour, Forest Flyer and Panorama Trail would be located within these watersheds.

Water Quality. The 2006-2011 CMR concludes that water quality conditions in Edgewood Creek have remained stable as compared to the 2001-2005 monitoring period. The five-year average for Turbidity shows reductions at the Above and Below sites. SRP and Nitrate/Nitrite averages have decreased since the prior 2001-2005 monitoring period. TP, TKN and TN concentrations are similar to the 2001-2005 monitoring period. A general observation is that annual constituent values for Turbidity and TSS are lower for Edgewood Creek than Heavenly Valley and Hidden Valley Creeks.

Water quality is rated as Good for NV-3, as based on compliance for the period of record from 2006-2013 (Appendix 3.1-A).

Stream Condition. The 2006-2011 CMR concludes improved and consistent conditions for reaches EC-1 and EC-2. Restoration projects competed in 2006 and 2007 have prevented further down cutting and widening of the channel within the EC-1 reach and very little change is observed in the cross-sectional geometry and longitudinal profile surveys. EC-2 displays either unchanged or slightly improved channel conditions, as a result of restoration efforts. The Upper and Lower Edgewood reaches shows no increased degradation from previous resort management activities.

Stream channel condition is rated as Good for NV-3.

Effective Soil Cover. Effective soil cover is rated as Excellent for NV-3.

BMP Effectiveness. Between three to 15 evaluations were completed each year in NV-3. On average 87.5% of the inspections concluded that permanent BMPs were fully implemented and fully effective. BMP effectiveness is rated as Good for NV-3.

CWE Program Implementation. A total of 14 CWE restoration projects were identified by MPA 07 mitigation measure 7.5-1 for implementation in NV-3. Of the 14 total projects, five (5) projects were required for completion between 2006 and 2013 and five projects or 100% have been completed. CWE program implementation is rated as Excellent for NV-3.

Overall Watershed Condition and Trend. Overall watershed conditions and trend is rated as Good and Improved for NV-3.

3.1-3 EVALUATION CRITERIA

A Project impact may result from a project-related physical change in the environment. Under NEPA, direct effects are caused by the Project and occur at the same time and place; indirect effects are caused by the Project and occur later in time or farther removed in distance, but are still reasonably foreseeable. A cumulative impact is the impact on the environment, which results from the incremental impact of the Project when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

An impact is considered significant for CEQA and TRPA, or an adverse effect under NEPA, if the potential impact exceeds the significance thresholds presented in Table 3.1-7.

Table 3.1-7

Evaluation Criteria and Points of Significance

Potential Impact	As Measured By	Point of Significance	Justification
WATER-1: Would the Project increase peak and total runoff such that downstream conveyance or storage facilities (creeks, reservoirs, pipes, basins, etc.) no longer have adequate capacity, create new sources of chronic erosion, or be located in areas of known chronic soil erosion in the Heavenly Valley Creek watershed (CA-1)?	TRPA Allowable Land Coverage for LCD 1a (In-Basin) Proximity to water bodies, and expected effectiveness of BMPS in preventing/mitigating sediment transport processes	Peak and total runoff increase such that downstream conveyance or storage facilities (creeks, reservoirs, pipes, basins, etc.) no longer have adequate capacity Creation of new sources of chronic soil erosion from new summer activities that adversely affects the receiving waters	TRPA Ski Area Master Plan Guidelines TRPA Code Chapter 30 TRPA Code Chapter 60 LTBMU Forest Plan Lahontan Basin Plan Chapter 5

Potential Impact	As Measured By	Point of Significance	Justification
WATER-2: Would the Project increase peak and total runoff such that downstream conveyance or storage facilities (creeks, reservoirs, pipes, basins, etc.) no longer have adequate capacity, create new sources of chronic erosion or be located in areas of known chronic soil erosion in the Gondola watershed (CA-7)?	TRPA Allowable Land Coverage for LCD 1a (In-Basin) Proximity to water bodies, and expected effectiveness of BMPS in preventing/mitigating sediment transport processes	Peak and total runoff increase such that downstream conveyance or storage facilities (creeks, reservoirs, pipes, basins, etc.) no longer have adequate capacity Creation of new sources of chronic soil erosion from new summer activities that adversely affects the receiving waters	TRPA Ski Area Master Plan Guidelines TRPA Code Chapter 30 TRPA Code Chapter 60 LTBMU Forest Plan Lahontan Basin Plan Chapter 5
WATER-3: Would the Project increase peak and total runoff such that downstream conveyance or storage facilities (creeks, reservoirs, pipes, basins, etc.) no longer have adequate capacity, create new sources of chronic erosion, or be located in areas of known chronic soil erosion in the the Mott Canyon watershed (NV-1)?	Proximity to water bodies, and expected effectiveness of BMPS in preventing/mitigating sediment transport processes	Peak and total runoff increase such that downstream conveyance or storage facilities (creeks, reservoirs, pipes, basins, etc.) no longer have adequate capacity Creation of new sources of chronic soil erosion from new summer activities that adversely affects the receiving waters	LTBMU Forest Plan Sierra Nevada Forest Plan Amendment
WATER-4: Would the Project increase peak and total runoff such that downstream conveyance or storage facilities (creeks, reservoirs, pipes, basins, etc.) no longer have adequate capacity, create new sources of chronic erosion, or be located in areas of known chronic soil erosion in the Daggett Creek watershed (NV-2+5)?	Proximity to water bodies, and expected effectiveness of BMPS in preventing/mitigating sediment transport processes	Peak and total runoff increase such that downstream conveyance or storage facilities (creeks, reservoirs, pipes, basins, etc.) no longer have adequate capacity Creation of new sources of chronic soil erosion from new summer activities that adversely affects the receiving waters	LTBMU Forest Plan Sierra Nevada Forest Plan Amendment

Potential Impact	As Measured By	Point of Significance	Justification
WATER-5: Would the Project increase peak and total runoff such that downstream conveyance or storage facilities (creeks, reservoirs, pipes, basins, etc.) no longer have adequate capacity, create new sources of chronic erosion, or be located in areas of known chronic soil erosion in the Edgewood Creek watersheds (NV-3, EDGE-1, EDGE-2)?	TRPA Allowable Land Coverage for LCD 1a (In-Basin) Proximity to water bodies, and expected effectiveness of BMPS in preventing/mitigating sediment transport processes	Peak and total runoff increase such that downstream conveyance or storage facilities (creeks, reservoirs, pipes, basins, etc.) no longer have adequate capacity Creation of new sources of chronic soil erosion from new summer activities that adversely affects the receiving waters	TRPA Ski Area Master Plan Guidelines TRPA Code Chapter 30 TRPA Code Chapter 60 LTBMU Forest Plan Sierra Nevada Forest Plan Amendment
WATER-6: Would Construction and Operation of the Project Lead to Noncompliance with Surface Water Quality Standards and Thresholds in Heavenly Valley Creek?	Compliance with TRPA Environmental Thresholds and surface water quality standards of the TRPA and Lahontan Compliance with the Heavenly Valley Creek TMDL	State and regional water quality standards are not satisfied Non-compliance with Board Order NO. R6T-2003-0032A2, Updated Waste Discharge Requirements and the associated Monitoring and Reporting Program and hence the Basin Plan Beneficial Uses for Heavenly Valley Creek are not maintained Water quality thresholds for Heavenly Valley Creek are not maintained	Lahontan Basin Plan Board Order No. R6T-2003-0032A2 TRPA 208 Plan Policies TRPA Code of Ordinance Chapter 60 LTMBU Forest Plan El Dorado County General Plan Alpine County General Plan

Potential Impact	As Measured By	Point of Significance	Justification
WATER-7: Would Construction and Operation of the Project Lead to Noncompliance with Surface Water Quality Standards and Thresholds for Edgewood Creek?	Compliance with TRPA Environmental Thresholds and surface water quality standards of the TRPA and NDEP	State and regional water quality standards are not satisfied Beneficial Uses for Edgewood Creek are not maintained Water quality thresholds Edgewood Creek are not maintained	TRPA 208 Plan Policies TRPA Code of Ordinance Chapter 60 NAC Chapter 445A.118-445A.225 LTMBU Forest Plan Douglas County Master Plan
WATER-8: Would Construction and Operation of the Project Lead to Noncompliance with Surface Water Quality Standards in Mott and Daggett Creeks?	Compliance with narrative surface water quality objectives of NDEP	State and water quality standards are not satisfied Beneficial Uses for Mott and Daggett Creeks are not maintained	NAC Chapter 445A.118-445A.225 LTMBU Forest Plan Douglas County Master Plan
WATER-C1: Would the Project have significant cumulative impacts to water resources in CA-1?	Cumulative Proposed Condition %ERA CWE off-site analysis and assessment of current channel condition	Cumulative %ERA exceeds Watershed TOC Watershed is determined to be at risk for exceedence of water quality standards in annual monitoring reports	TRPA Ski Area Master Plan Guidelines TRPA Code of Ordinance Chapter 60 TRPA Environmental Thresholds LTBMU Forest Plan Lahontan Basin Plan
WATER-C2: Would the Project have significant cumulative impacts to water resources in CA-7?	Cumulative %ERA CWE off-site analysis and assessment of current channel condition	Cumulative %ERA exceeds Watershed TOC Watershed is determined to be at risk for exceedence of water quality standards in annual monitoring reports	TRPA Ski Area Master Plan Guidelines TRPA Code of Ordinance Chapter 60 TRPA Environmental Thresholds LTBMU Forest Plan Lahontan Basin Plan

Potential Impact	As Measured By	Point of Significance	Justification
WATER-C3: Would the Project have significant cumulative impacts to water resources in NV-1?	Cumulative %ERA CWE off-site analysis and assessment of current channel condition	Cumulative %ERA exceeds Watershed TOC Watershed is determined to be at risk for exceedence of water quality standards in annual monitoring reports	LTBMU Forest Plan
WATER-C4: Would the Project have significant cumulative impacts to water resources in NV-2+5?	Cumulative %ERA CWE off-site analysis and assessment of current channel condition	Cumulative %ERA exceeds Watershed TOC Watershed is determined to be at risk for exceedence of water quality standards in annual monitoring reports	LTBMU Forest Plan
WATER-C5: Would the Project have significant cumulative impacts to water resources in NV-3, EDGE-1, and EDGE-2?	Cumulative %ERA CWE off-site analysis and assessment of current channel condition	Cumulative %ERA exceeds Watershed TOC Watershed is determined to be at risk for exceedence of water quality standards in annual monitoring reports	TRPA Ski Area Master Plan Guidelines TRPA Code of Ordinance Chapter 60 TRPA Environmental Thresholds LTBMU Forest Plan

Source: HBA 2014

3.1-4 ENVIRONMENTAL IMPACTS AND CONSEQUENCES

This section describes the potential direct, indirect and cumulative watershed effects to water resources that would occur through implementation of the No Action, Proposed Action and Alternatives. Impacts from construction of permanent impervious surfaces, temporary disturbance to soils, and removal of vegetation are evaluated. According to Flood Insurance Rate Maps (Revised December 4, 1986) produced by the Federal Emergency Management Agency, no 100-year flood boundaries are mapped within the Heavenly Mountain Resort special use permit area.

As a result of regulatory compliance and provisions of the MPA 07, Heavenly must comply with required design features and criteria for the No Action, Proposed Action and Alternatives. These requirements include:

- 7.4-1 On-going Construction Erosion Reduction Program (CERP)
- 7.4-2 Construct Infiltration Facilities
- 7.4-3 (WATER-1) Control Runoff from Existing Facilities
- 7.4-4 (WATER-2) Meet Water Quality Standards
- 7.4-5 (WATER-3) Implement Adaptive Ski Run Prescriptions
- 7.4-6 (WATER-4) Control Runoff due to Future Construction and Long-term Operations of Facilities
- 7.4-7 Avoid Disturbance to SEZ or Restore/Create SEZ
- 7.4-8 Avoid Disturbance to Wetlands or Restore/Create Wetlands
- 7.4-9 (SEZ-3) Restore Future Disturbed SEZ to Meet MP 96 Mitigation Measure 7.4-7 Requirements
- 7.4-10 (SEZ-4) Restore Future Disturbed Jurisdictional Waters and Wetlands to Meet MP 96 Mitigation Measure 7.4-8 Requirements
- 7.4-15 Minimize Removal/Modification of Deciduous Trees, Wetlands, and Meadows
- 7.5-1 REVISED CWE Restoration Program
- 7.5-2 REVISED Collection/Monitoring Agreement (On-going Environmental Monitoring Program)
- Design features required by Forest Service, TRPA, and Lahontan and Project-specific features summarized in Section 2.3.5 of the Project Description (Chapter 2)

3.1-4.1 No Action Alternative

The No Action Alternative results from denial of permits for this Project, and therefore represents a continuation of existing management practices without changes, additions, or upgrades to existing conditions. The existing conditions, as described in Section 3.1-2.2 above, provides a baseline for comparing the effects of the three action alternatives.

Existing winter uses would continue and projects approved in the MPA 07 could be implemented under project-level approvals. Existing summer uses would continue, including sightseeing via the Heavenly Gondola, hiking and mountain biking on existing roadways and pathways, and operation of existing infill activities at the Top of the Gondola (e.g., rock climbing wall, tubing hill, ziplines, canopy tour and rope courses). Direct, indirect, and cumulative effects and the associated design features and mitigation measures, as related to hydrology and water quality, for the No Action Alternative are contained in Chapter 3.1 of the MPA 07 EIR/EIS/EIS. Therefore, project-level effects are not addressed in this section for the No Action Alternative; however, cumulative effects analyses contained in impacts WATER-C1 through WATER-C5 consider projects and actions approved in the MPA 07.

3.1-4.2 Proposed Project, Alternative 1 and Alternative 2 – Surface Runoff and Soil Erosion

TRPA Code Chapters 30, 33, and 60, the 208 Plan, the Basin Plan (Chapter 5), the USDA Forest Service Soil and Water Handbook (USFS 2011), and construction permit condition detail the requirements for the control of erosion on and off-site and the stabilization of soils upon completion of ground disturbance activities. Analysis of direct and indirect effects to soil quality and function is presented in Impact GEO-2 in Chapter 3.4, which addresses potential short-term construction impacts and effectiveness of temporary BMPs.

The analyses for impacts to surface runoff are similar for each analyzed watershed; the analysis is divided by watershed to allow a focus on those watersheds that may have a potential adverse impacts. The impacts are designated WATER-1, WATER-2, WATER-3, WATER-4 and WATER-5. Each analysis considers Project components at the watershed scale to determine if new permanent disturbance and tree removal would combine with effects of past development to result in increased peak and total runoff or new areas of chronic soil erosion. These analyses consider the effects of individual project components to determine if project design features and permanent BMPs would be effective to avoid and minimize change in peak and total runoff and soil erosion following the construction period and if individual project components would create new sources for chronic soil erosion or be located in areas of know chronic soil erosion.

Increases in peak and total runoff due to past vegetation removal and impervious surface construction would persist under all alternatives, and are addressed in cumulative impacts. Project-related increases in peak and total runoff that would compromise the capacity of downstream conveyances or storage facilities (e.g., creeks, reservoirs, pipes, detention basins, etc.), or accelerate erosion in these natural and man-made systems would constitute a significant impact or adverse effect and are analyzed by watershed in Impacts WATER-1 through WATER-5.

The Proposed Action would result in a maximum of 8.45 acres of permanent soil disturbance and a maximum of 18 acres of temporary disturbance within the Heavenly special use permit area. Inclusion of the Panorama Trail (which may not require an allocation of land coverage as a public use trail) would increase permanent and temporary project disturbance to 9.7 and 19.4 acres, respectively. Temporary disturbance estimates include the construction disturbance area and the tree clearing necessary for linear project component corridors. Table 3.1-8 presents total permanent disturbance and temporary disturbance (including areas of tree clearing) by watershed.

Table 3.1-8

Permanent Disturbance and Temporary Disturbance by Watershed

Watershed	Permanent Land Coverage/Disturbance (acres)	Temporary Disturbance (acres)
CA-1	2.1	4.5
CA-7	0.04	0.3
NV-1	2.7	7.1
NV-3	0.21	0.42
Edge-1	0.86	1.3*
Edge-2	0.72	1.0*
NV-2+5	3.1	4.8
Totals	**9.7 acres**	**19.4 acres**

Source: RCI Project Plan Sheets May 2014

* Temporary disturbance area estimated based on percentage of permanent disturbance in the Edge-1 and Edge-2 watersheds. Panorama Trail would be field fitted to minimize the construction corridor.

IMPACT: WATER-1: Would the Project increase peak and total runoff such that downstream conveyance or storage facilities (creeks, reservoirs, pipes, basins, etc.) no longer have adequate capacity, create new sources of chronic erosion or be located in areas of known chronic soil erosion in the Heavenly Valley Creek watershed (CA-1)?

CEQA

Analysis: *Less than Significant Impact; Proposed Project and Alternatives*

Proposed Project. Within the 1564 acre Heavenly Valley Creek watershed (CA-1) permanent land coverage would increase by 2.1 acres under the Proposed Project. Construction of the Mid-Station Canopy Tour, Sky Cycle Canopy Tour, Forest Flyer Alpine Coaster, Infill Activities, Sky Meadows Zipline Canopy Tour, Sky Meadows Challenge Course, Ridge Run Lookout Tower and Observation Deck would create temporary soil disturbance and permanent tree removal. Interpretive activities would occur at Sky Deck, which is an existing structure in the Stream

Environment Zone (SEZ). Appendix 3.1-E details the proposed locations of project components in context with the CA-1 drainage network.

Under the Proposed Action, new permanent land coverage associated with project components located in CA-1 would comply with TRPA allowable land coverage for LCD 1a and the excess coverage mitigation program, a program that limits the extent of permanent disturbance on sensitive lands. Tree removal and construction disturbance (4.5 acres) and new impervious surfaces (2.1 acres) would affect less than one (1) percent of the CA-1 watershed and would not likely result in measurable increases in peak and total runoff amounts.

The following project components would be located within the Lake Tahoe Basin and within watershed CA-1, which drains to Heavenly Valley Creek. Potential impacts to surface runoff and soil erosion are considered for each project component, along with the specific design features proposed for avoidance and minimization of potential direct and indirect effects to surface runoff and soil erosion.

Adventure Peak Project Components. The Sky Cycle, Mid Station Canopy Tour, and infill activities at the Top of the Gondola are located within the CA-1 watershed but due to topography and distance to Heavenly Valley Creek channel have low hydrologic connectivity to Heavenly Valley Creek. Design features proposed for these project components would be adequate for avoidance of long-term operational effects to surface runoff and soil erosion.

Emergency Gondola Snow Cat Evacuation Route. This project component requires tree removal to establish a 25-30 foot wide corridor for emergency operational use during winter conditions. Tree removal would be completed over the snow to avoid soil disturbance. Design features for this project component would be adequate for avoidance and minimization of long-term operational effects to surface runoff and soil erosion.

Mid-Station Canopy Tour. This project component requires minimal permanent soil disturbance and 0.11 acres of tree removal on low to moderate slopes. The Canopy Tour would operate year round and increase summer visitor use and associated resort operations and maintenance to the area between the Mid-station and Gondola. Because of its location within the CA-1 and CA-7 watersheds, this Canopy Tour and the associated hiking and maintenance trails are unlikely to affect drainages with significant sediment transport ability or connectivity to drainages in CA-7 or Heavenly Valley Creek in CA-1. Design features for this project component would be adequate for avoidance and minimization of long-term operational effects to surface runoff and soil erosion.

Forest Flyer Alpine Coaster. This project component requires minimal permanent soil disturbance because of the elevated track on pilings and 0.7 acres of tree removal on slight to moderate slopes. The top portion of the Coaster would be located in a watershed previously undeveloped with resort activities. The watershed is tributary to Edgewood Creek. The bottom portion is located within relatively flat areas at the top of watershed CA-1. The Coaster would operate year round and increase summer visitor use and associated resort operations and

maintenance to a previously undisturbed area. Because of its location within the relatively flat and upper portions of the CA-1 and EDGE-1 watersheds, this Alpine Coaster and the associated footpaths are unlikely to affect drainages with significant sediment transport ability or connectivity to Heavenly Valley Creek or Edgewood Creek. Design features for this project component would be adequate for avoidance and minimization of long-term operational effects to surface runoff and soil erosion.

Mountain Bike Skills Park. This project component is considered an infill activity adjacent to the Gondola Top Station. The Park requires 15,200 square feet of permanent soil disturbance and installation and removal of a seasonal tent structure. This portion of the resort and watershed CA-1 has been previously developed. Because of its location within the watershed, the Park is unlikely to affect drainages with significant sediment transport ability or connectivity to Heavenly Valley Creek. Design features for this project component would be adequate for avoidance and minimization of long-term operational effects to surface runoff and soil erosion.

Infill Activities at Adventure Peak. Other infill activities at the Gondola Top Station area include disc golf and a kid's zipline. The infill activities would require minimal permanent soil disturbance and tree removal. This portion of the CA-1 watershed has been previously disturbed and developed for winter and summer uses. Although infill activities would increase summer time use and associated resort operation and maintenance requirements, because of location within the watershed, the infill activities are unlikely to affect drainages with significant sediment transport ability or connectivity to Heavenly Valley Creek. Design features for this project component would be adequate for avoidance and minimization of long-term operational effects to surface runoff and soil erosion.

Sky Cycle Canopy Tour. This project component would be located to the southwest of the Gondola Top Station in a previously undeveloped portion of watershed CA-1. The Canopy Tour would require 14,000 square feet of permanent soil disturbance for platforms and a 5,600-foot long hiking trail. The Coaster would operate year round and increase summer visitor use and associated resort operations and maintenance requirements to a previously undisturbed area of CA-1. Because of its location within the watershed and the above ground configuration, this Canopy Tour is unlikely to cross drainages with significant sediment transport ability or connectivity to Heavenly Valley Creek. The hiking/maintenance trails would likely require increased monitoring and maintenance because of location on moderate to steep slopes. Design features for this project component would be adequate for avoidance and minimization of long-term operational effects to surface runoff and soil erosion.

Adventure Peak Hiking/Maintenance Trails. Table 2-1 in the Project Description (Chapter 2) details the characteristics of the Adventure Peak Trails discussed for the Mid-station Canopy Tour, Sky Cycle Canopy Tour, Forest Flyer Alpine Coaster, Kids Zipline and Disc Golf. Total permanent soil disturbance for hiking and maintenance trails and footpaths would be around 29,038 square feet. Design features for these trails and footpaths would be adequate for avoidance and minimization of long-term operational effects to soil erosion, but trails located on

moderate to steep slopes would require increased monitoring and maintenance, but

East Peak Lodge Hiking Trail. The hiking trail would connect the Adventure Peak area at the Top of the Gondola (watershed CA-1) to the East Peak Lodge (watershed NV-2+5). The project component would require approximately 12,000 square feet of permanent soil disturbance (1,200 square feet in CA-1 and 10,800 square feet in NV-2+5). Temporary disturbance is estimated at 36,000 square feet (0.83 acres). The hiking trail would increase summer use and associated resort operation and maintenance activities in NV-2+5; because of location within the watersheds, the trail is unlikely to cross drainages with significant sediment transport ability or connectivity to Heavenly Valley Creek in CA-1. In watershed NV-2+5, the hiking trail terminates above East Peak Lake and would not pose direct effects to Daggett Creek. Design features for this project component would be adequate for avoidance and minimization of long-term operational effects to surface runoff and soil erosion.

Sky Basin Project Components. Activities in Sky Meadows Basin would be accessed from the Tamarack Express lift, on foot, or by using the Mountain Excursion tour vehicles. Visitors would return to Adventure Peak using the Mountain Excursion vehicles or on foot. Groups of visitors would be led by trained guides. In the Sky Basin portion of CA-1 (543 acres), runoff to Heavenly Valley Creek would continue to be captured and attenuated in California Reservoir to avoid direct and indirect effects to Heavenly Valley Creek from the reservoir downstream to the Property line station. Sky Basin project components (Sky Meadows Zipline Canopy Tour, Sky Basin Hiking and Maintenance Trails, Sky Meadows Challenge Course) would create temporary disturbance and new permanent disturbance in areas of the watershed with direct hydrologic connectivity to Heavenly Valley Creek channel and Sky Meadows SEZ. Increased erosion from these disturbances could have potentially significant impacts to the Sky Meadows reach of Heavenly Valley Creek if fine sediment is transported to this reach, which already indicates biotic impairment (BMI) likely due to fine sediment. Because Sky Basin project components would increase summer uses and visitors and create disturbance in areas with direct hydrologic connectivity to Heavenly Valley Creek and Sky Meadows SEZ, site-specific BMPs and design features have been incorporated in project-level designs to minimize the are of permanent disturbance, ensure disturbed areas are stabilized, and maximize SEZ and stream channel buffers.

Ridge Run Lookout Tower and Observation Deck. This project component would require minimal permanent soil disturbance and no tree removal. The observation tower would be built near the existing Ridge Run Overlook and the existing picnic deck adjacent to the Top of Sky Express lift would be rebuilt and expanded by 1,000 square feet. The project components would have minimal effects to soils and because of location within the watershed (e.g., along the back of the ridgeline at the top of the watershed); the Observation Deck and Lookout Tower would have little to no connectivity to Heavenly Valley Creek. Design features for this project component would be adequate for avoidance of long-term operational effects to surface runoff and soil erosion.

Sky Meadows Zipline Canopy Tour/ Sky Basin Hiking and Maintenance Trail. This project component would require 24,000 square feet of permanent soil disturbance for platforms and maintenance trails, approximately three (3) acres of tree removal, and 30 by 30-foot areas of temporary disturbance for five (5) steel zipline platforms. Approximately 2,700 feet of trail would be constructed for public access to the start and finish platforms and 8,800 feet of trail would be used for platform maintenance access by Heavenly staff. The top and base areas of the Zipline would be located in developed portions of the watershed, while the linear corridor would be located in an undeveloped forested area of watershed CA-1.

Canopy tour design features for avoidance and minimization of soil disturbance would include:

- The platform locations and project access and staging areas are located outside of Heavenly Valley Creek headwaters SEZ areas;
- Limited disturbance and construction staging areas. (MPA 07 Mitigation Measure 7.4-14)
- Limit tree removal to minimum amount necessary, including white bark pine where present. (MPA 07 Mitigation Measure 7.5-23)
- Over-the-snow tree removal and yarding where feasible based on implementation timing and snowpack, over a minimum 12 inches compacted snow.
- Trees which are removed over the snow will be skidded over a minimum of 12 inches of compacted snow behind a snow cat to a staging area in order to prevent soil disturbance. Removed trees will be limbed and chipped at the staging area for use for erosion control and soil amendments.

The proposed hiking and maintenance trails are located on moderate to steep slopes, and cross numerous intermittent and ephemeral channels to Heavenly Valley Creek. Appropriate design features (in compliance with current Forest Service Standards) for trail design, construction, maintenance, and monitoring are needed to minimize the potential for erosion and sediment transport into channels. Design features for the hiking and maintenance trails include:

- Site-specific layout of walking paths and hiking trails with Forest Service specialists (See Trail Construction Standards listed in Chapter 2, Section 2.3.5)
- Implementation of Forest Service-approved temporary and permanent water quality Best Management Practices (BMPs). (MPA 07 Measures 7.4-1 through 7.4-6)
- Separating top soil and duff layers from excavation spoils for later re-use in revegetation where possible. (MPA 07 Measures 7.4-1 through 7.4-6)
- Implementing the adaptive management approach for revegetation and erosion control methods contained in the 2007 MPA. (MPA 07 Measure 7.6-1 – included as Section 5.8-1 in Chapter 5)

- Incorporation of organic material into soil amendments to promote soil infiltration and plant establishment. (MPA 07 Measures 7.4-2 and 7.5-24)
- Specific pre-construction and post-construction monitoring evaluations of disturbed areas and success/re-establishment of revegetation and soil functions. (MPA 07 Measure 7.5-2)
- Implementation of permanent water quality BMPs following project construction. (MPA 07 Measure 7.4-6)
- Multi-year, post-construction monitoring and reporting of construction areas as required by the Forest Service BMP Effectiveness Protocol Program. (MPA 07 Measure 7.5-2)

Forest Service monitoring results reported in the Trail Retrofit Monitoring Report (LTBMU 2012) indicate that non-motorized trails are not a significant source of sediment when built following the Forest Service trail construction requirements that tier from the National Best Management Practices for Water Quality on National Forest System Lands, Volume 1: National Core BMP Technical Guide to the following manuals and handbooks: FSM 2353, FSH2309.18, FSM 7715.5, FSM 7723, and EM 7720-104. Chapter 2, Section 2.3.5 outlines trail construction standards and maintenance requirements that are applicable to the Project. Specifically, FSM 2309.18 Trails Management Handbook identifies planning (NEPA), design, construction, and operation requirements for trails. Design standards from this handbook have been identified for the Heavenly Epic Discovery trail system. Additionally, the following site-specific standards would be required for the Epic Discovery trail systems:

- Drainage Spacing: 150 feet typical intervals. Drainages may be spaced at a maximum of 250 feet to fit with natural landscape. As slope increases, drainage spacing decreases. Where rolling grade dips are not constructed into the trail tread, drainage dips shall be used on mountain bike trails. Where grades exceed 7%, drainage dips shall be armored with rock or paver stones.
- Trail Tread Armoring: In high impact areas, trail hardening techniques shall be used to prevent the tread from becoming incised, causing soil loss and water channelization. Areas such as high braking areas, trail sections steeper than 7% and corners shall be removed for armoring.

Design features for this project component would be adequate for avoidance and minimization of long-term operational effects to surface runoff and soil erosion.

Sky Meadows Challenge Course. This project component is proposed within the Sky Meadows SEZ between Sky Deck and the base of Sky Express Lift and would require 742 square feet of new permanent land coverage/soil disturbance, 604 square feet of which is proposed in LCD 1b. The ropes course would consist of above ground platforms and rope walkways/bridges installed on existing mature trees. The existing maintenance road would provide access in the summer. The Course would be operated year round. As documented in Chapter 3.4, findings cannot be made for the proposed access trails within the SEZ. Therefore,

the Challenge Course access trails will be relocated outside of the SEZ and closer to the existing maintenance road.

The Sky Meadows has been previously disturbed and developed for winter and some existing summer uses. Operation of this project component would increase summer visitor use of the SEZ and associated resort operations and maintenance activities in the SEZ. A 440 square parking area is proposed adjacent to the Challenge Course, as identified in the Mountain Excursion Tour description. For avoidance of long-term operational effects to surface runoff and soil erosion, specific design features are required to avoid, minimize and manage summer operational effects to SEZ/riparian habitat and other sensitive vegetation communities located nearby Epic Discovery summer activities, specifically Sky Meadows SEZ and Heavenly Valley Creek channel. The following design measures shall be implemented:

- Improve vegetation management – as proposed by MPA 07 mitigation measures 7.4-7 and 7.4-9 for new SEZ disturbance, Heavenly shall trim only the tops of vegetation within the Sky Meadows SEZ (to a height of no less than 3 feet tall). However, for the five feet immediately adjacent to each side of the Heavenly Valley Creek bank, no vegetation shall be trimmed except for an approximately 25 to 30 foot wide creek crossing that provides winter skier access between the base of the Sky and Canyon Express lifts and the Sky Deck and Restrooms.

- Improve protection of sensitive vegetation and soils from human disturbance – as proposed by MPA 07 mitigation measure 7.5-21 for protection of Tahoe draba, Heavenly shall install fencing/barriers during summer use periods along all existing and proposed roadways and trails where human activity will take place near SEZs (e.g., Sky Meadows), sensitive plants (e.g., Tahoe draba), and steeps slopes susceptible to erosion.

- Heavenly shall define the staging and training area for the Sky Meadows Challenge Course with fencing/barriers outside of the Sky Meadows SEZ, which would avoid permanent land coverage in SEZ/LCD 1b.

- Heavenly shall define the parking area for the Mountain Excursion Tour vehicles with fencing/barriers and separate it from nearby SEZ.

- Heavenly shall locate all temporary and permanent disturbance required for the construction and operation of the Sky Meadows Challenge Course outside of the mapped SEZ, which would avoid permanent land coverage in SEZ/LCD 1b.

- Heavenly shall use fencing/barriers to exclude pedestrian access to the mapped SEZ located under the Sky Meadows Challenge Course (e.g., stairway access from the Sky Deck to the SEZ will be closed during summer use).

- Heavenly shall use fencing/barriers as needed to direct summer visitors to the existing Sky Meadows bathrooms using the existing summer maintenance roadway.

Portion of Mountain Excursion Tour. This project component would increase summer use and operations of existing access roads throughout the Heavenly Mountain Resort. Parking areas are proposed adjacent to proposed activities and existing roads. Increased summer use could result in widening of access roads, creation of pullouts in high risk areas and increased annual road maintenance requirements. The 2006-2011 CMR and 2012 and 2013 Annual Environmental Monitoring Reports conclude that past practices, related to use of access roads should be addressed to prevent potential adverse soil and water impacts. Soil compaction has been noted at pullout locations. Overwatering of the road surface by water trucks completing dust abatement sometimes occurs. When these actions occur in close proximity to stream channels, adverse effects can result. For avoidance and minimization of long-term operational effects to surface runoff and soil erosion, design features for this project component include:

- Pullouts/visitor stops would be designed at low risk and hydrologically stable locations.
- Site-specific maintenance/road improvement needs would be identified and completed prior to public operations at the beginning of each summer season.
- Ongoing dust control would be provided by a water truck on a regular daily or as needed in order to minimize dust and maintain a high-quality experience for the visitors.

Panorama Trail. This project component would require 16,380 square feet of new permanent soil disturbance in watershed CA-1. Design features for this project component would be adequate for avoidance and minimization of long-term operational effects to surface runoff and soil erosion.

Summary. Soil disturbance and permanent land coverage resulting from each project component would be mitigated through application of permanent BMPs and design features illustrated on project proposals and engineering plan, outlined in the on-going MMP, detailed in the on-going CERP, and monitored by the on-going Environmental Monitoring Program. Based on watershed CA-1 BMP implementation and effectiveness evaluations reported in the 2006-2011 CMR and 2012 and 2013 Annual Reports (CardnoEntrix 2012, 2013, 2014), temporary BMPs installed and maintained during construction activities and permanent BMPs installed as project design features, would be effective at infiltrating runoff and controlling erosion.

Implementation of resource protection measures as outlined in the USDA Forest Service Region 5 Water Quality Management Handbook (USFS 2011) along with the design features outlined in Chapter 2 and the compliance measures and associated plans required by the TRPA, Lahontan and Forest Service for project-

level approval and permitting would avoid potentially adverse direct and indirect effects to surface runoff and soil erosion. In conclusion, summer recreation would not adversely affect surface runoff or create new areas of chronic soil erosion because activities and uses would be conducted in accordance with law, regulation, policy, Forest Plan Standards and guidelines, and project-specific resource protection measures/design features.

This analysis concludes that the Proposed Project proposals in CA-1 include compliance measures and project-specific resource protection measures that are appropriate and adequate to control erosion on and off-site and stabilize soils during and upon completion of construction and soil disturbance activities. The project-level effects would be reduced to a level of less than significant.

Alternative 1 (Sky Meadows Basin Coaster). Alternative 1 would add an 6,656 square feet (0.15 acres) of permanent soil disturbance and 2.5 acres of temporary disturbance to the Sky Basin portion of CA-1, while removing approximately 6,000 square feet of permanent disturbance and 1.0 acres of temporary disturbance from the Adventure Peak portion of CA-1 that would be associated with the Forest Flyer. Permanent disturbance estimates presented in Table 3.1-6 would be 992 square feet more under Alternative 1. New permanent disturbance under Alternative 1 would comply with TRPA allowable land coverage for LCD 1a.

Under Alternative 1, the Coaster would be located in the general location of the proposed Sky Meadows Zipline Canopy Tour in a currently unmanaged portion of CA-1. Direct and indirect effects to Heavenly Valley Creek could result from tree removal and new impervious surfaces, increased foot traffic, and additional operation and maintenance activities in a portion of CA-1 with direct hydrologic connectivity to Heavenly Valley Creek.

As with the Zipline, the top and base areas of the Coaster would be located in previously developed portions of the watershed, while the linear coaster corridor would cross an undeveloped area of watershed CA-1 and would generally follow the centerline of the Sky Meadows Zipline Canopy Tour. The bottom portion of the coaster alignment is actively managed for winter-use activities and the tops of vegetation are cut each fall to facilitate snowmaking and management. One bridge crossing at the existing summer maintenance access road and two bridge crossings of existing ski runs would be necessary. Plan sets indicate that the uphill towline would cross the Heavenly Valley Creek channel. The Coaster would be constructed on steep slopes (1,250 foot vertical drop). The Coaster, as currently located, would cross drainages with moderate to high sediment transport ability and hydrologic connectivity to Heavenly Valley Creek. Design features for this project component would include the Sky Basin resource protection measures listed above for the Challenge Course.

Implementation of resource protection measures as outlined in the USDA Forest Service Region 5 Water Quality Management Handbook (USFS 2011) along with the design features outlined in Chapter 2 and the compliance measures and

associated plans required by the TRPA, Lahontan and Forest Service for project-level approval and permitting would avoid potentially adverse direct and indirect effects to surface runoff and soil erosion. Summer recreation would not adversely affect surface runoff or create new areas of chronic soil erosion because activities and uses would be conducted in accordance with law, regulation, policy, Forest Plan Standards and guidelines, and project-specific resource protection measures/design features.

This analysis concludes that the Alternative 1 project proposals in CA-1 include compliance measures and project-specific resource protection measures that are appropriate and adequate to control surface runoff and soil erosion on and off-site and stabilize soils during and upon completion of construction and soil disturbance activities. The project-level effects would be reduced to a level of less than significant.

Alternative 2 (Eliminate Sky Meadows Challenge Course). Alternative 2 would eliminate the Sky Meadows Challenge Course from the Proposed Action project proposal. As such, a minor reduction (i.e., elimination of 742 square feet of proposed land coverage for access trails) in permanent disturbance would result. This Alternative would retain the Sky Meadows resource protection measures to control visitor access and minimize potential indirect effects from increased summer use of the Sky Meadows.

Implementation of resource protection measures as outlined in the USDA Forest Service Region 5 Water Quality Management Handbook (USFS 2011) along with the design features outlined in Chapter 2 and the compliance measures required by the TRPA, Lahontan and Forest Service for project-level approval and permitting would avoid potentially adverse direct and indirect effects to surface runoff and soil erosion. Summer recreation would not adversely affect surface runoff or create new areas of chronic soil erosion because activities and uses would be conducted in accordance with law, regulation, policy, Forest Plan Standards and guidelines, and project-specific resource protection measures.

This analysis concludes that the Alternative 2 project proposals in CA-1 include compliance measures and project-specific resource protection measures that are appropriate and adequate to control surface runoff and soil erosion on and off-site and stabilize soils during and upon completion of construction and soil disturbance activities. The project-level effects would be reduced to a level of less than significant.

TRPA

Analysis: *Less than Significant Impact; Proposed Action and Alternatives*

Potential direct and indirect effects to surface runoff and soil erosion in watershed CA-1 are discussed above in the CEQA analysis. The analysis concludes that the Proposed Action, Alternative 1 and Alternative 2 project proposals in CA-1 include design features and project-specific resource protection measures that are appropriate and adequate to control surface runoff and soil erosion on and off-site

and stabilize soils during and upon completion of construction and soil disturbance activities. TRPA regional water quality goals #1 and #2 would be satisfied.

NEPA

Analysis: *No Adverse Effects; Proposed Action and Alternatives*

Management Practice 30, "Water Quality Maintenance and Improvement," of the Forest Plan applies to watershed CA-1. This management practice prohibits increases in peak and total runoff due to vegetation removal and impervious surface construction. The design features described in Chapter 2 would implement many of the practice standards and guidelines outlined in the Forest Plan and *Soil and Water Conservation Handbook* (USFS 2011) for avoidance of adverse effects. Chapter 2, Section 2.3.5, outlines trail construction standards and maintenance requirements that are applicable to the Project. Forest Service trail construction requirements tier from the *National Best Management Practices for Water Quality on National Forest System Lands, Volume 1: National Core BMP Technical Guide* to the following manuals and handbooks: FSM 2353, FSH2309.18, FSM 7715.5, FSM 7723, and EM 7720-104. The *Sierra Nevada Forest Plan Amendment (SNFPA) Final Supplemental EIS* outlines the standards and guidelines associated with Riparian Conservation Areas (RCAs) and Critical Aquatic Refuges (CARs) located on National Forest Lands. Project components located within or in the vicinity of Sky Meadows would comply with such standards and guidelines outlined in the SNFPA Record of Decision.

Direct effects. Direct effects to surface runoff and soil erosion that would result from Project implementation would include vegetation removal, loss of soil hydrologic function from soil compaction during construction, and increased impervious surface associated with new summer use facilities and hiking, biking and maintenance trails.

Indirect effects. Indirect effects could include reduction in effective soil cover, increased summer visitation to sensitive areas, increased opportunity for user-created trails, and increased resort operation and maintenance requirements in previously undeveloped or unmanaged areas of the resort.

Summary. Direct and indirect effects from tree removal, temporary and permanent disturbance within the CA-1 watershed are discussed above under the CEQA analysis. This analysis concludes that the Proposed Action, Alternative 1 and Alternative 2 project proposals on National Forest Lands include design features and project-specific resource protection measures that are appropriate and adequate to control surface runoff and soil erosion on and off-site and stabilize soils during and upon completion of construction and soil disturbance activities. Summer recreation would not adversely affect surface runoff or create new areas of chronic soil erosion because activities and uses would be conducted in accordance with law, regulation, policy, Forest Plan standards and guidelines, and project-specific resource protection measures.

IMPACT: WATER-2: Would the Project increase peak and total runoff such that downstream conveyance or storage facilities (creeks, reservoirs, pipes, basins, etc.) no longer have adequate capacity, create new sources of chronic erosion or be located in areas of known chronic soil erosion in the Gondola watershed (CA-7)?

CEQA

Analysis: *Less than Significant Impact; Proposed Action and Alternatives*

Within the 305-acre Gondola watershed (CA-7) permanent land coverage would increase by 0.04 acres through construction of a portion of the Mid-station Canopy Tour, the access and maintenance trails, and the connector trail to the Panorama bike trail.

The Emergency Gondola Snow Cat Evacuation Route is partially located in this watershed. The project component results in no permanent land coverage and tree removal would occur over the snow to avoid 1.3 acres of temporary disturbance.

The permanent land coverage associated with components of the Proposed Action located in CA-7 would comply with TRPA base allowable land coverage for LCD 1a and the excess coverage mitigation program, a program that limits the extent of permanent disturbance on sensitive lands.

Temporary disturbance, tree removal (0.3 acres) and new permanent disturbance would not result in measurable increases in peak and total runoff amounts. Project components would not be installed in proximity to an active channel because no such drainage feature exists in this portion of the watershed. Hydrologic connectivity to a water body is extremely low in this watershed.

Summary. Soil disturbance resulting from each project component would be mitigated through application of permanent BMPs and design features illustrated on project proposals and engineering plan, outlined in the on-going MMP, detailed in the on-going CERP, and monitored by the on-going Environmental Monitoring Program. Based on watershed CA-7 BMP implementation and effectiveness evaluations reported in the 2006-2011 CMR and 2012 and 2013 Annual Reports (CardnoEntrix 2012, 2013, 2014), temporary BMPs installed and maintained during construction activities and permanent BMPs installed as project design features would be effective at infiltrating runoff and controlling soil erosion.

Implementation of resource protection measures as outlined in the USDA Forest Service Region 5 Water Quality Management Handbook (USFS 2011) along with the design features outlined in Chapter 2 and the compliance measures and associated plans required by the TRPA, Lahontan and Forest Service for project-level approval and permitting would avoid potentially adverse direct and indirect effects to surface runoff and soil erosion. Summer recreation would not adversely affect surface runoff or create new areas of chronic soil erosion because activities

and uses would be conducted in accordance with law, regulation, policy, Forest Plan standards and guidelines, and project-specific resource protection measures.

This analysis concludes that the Project proposals in CA-7 include resource protection measures and design features that are appropriate and adequate to control erosion on and off-site and stabilize soils during and upon completion of construction and soil disturbance activities. The project-level effects would be reduced to a level of less than significant.

TRPA

Analysis: *Less than Significant Impact; Proposed Action and Alternatives*

Potential direct and indirect effects to surface runoff and soil erosion in watershed CA-1 are discussed above in the CEQA analysis. The analysis concludes that the Project proposals in CA-7 include design features and project-specific resource protection measures that are appropriate and adequate to control surface runoff and soil erosion on and off-site and stabilize soils during and upon completion of construction and soil disturbance activities. Project-level effects would be reduced to a level of less than significant. TRPA regional water quality goals #1 and #2 would be satisfied.

NEPA

Analysis: *No Adverse Effects; Proposed Action and Alternatives*

Management Practice 30, "Water Quality Maintenance and Improvement," of the Forest Plan applies to watershed CA-7. This management practice prohibits increases in peak and total runoff due to vegetation removal and impervious surface construction. The design features described in Chapter 2 would implement many of the practice standards and guidelines outlined in the Forest Plan and *Soil and Water Conservation Handbook* (USFS 2011) for avoidance of adverse effects.

Potential direct and indirect effects to surface runoff and soil erosion in watershed CA-1 are discussed above in the CEQA analysis. The analysis concludes that the Project proposals on National Forest Lands in CA-7 include design features and project-specific resource protection measures that are appropriate and adequate to control surface runoff and soil erosion on and off-site and stabilize soils during and upon completion of construction and soil disturbance activities.

This analysis concludes that the Project proposals in CA-7 include resource protection measures and design features that are appropriate and adequate to control erosion on and off-site and stabilize soils during and upon completion of construction and soil disturbance activities. Project-level effects would not result in direct or indirect adverse effects to surface runoff or soil erosion.

IMPACT: WATER-3. Would the Project increase peak and total runoff such that downstream conveyance or storage facilities (creeks, reservoirs, pipes, basins, etc.) no longer have adequate capacity, create new sources of chronic erosion or be located in areas of known chronic soil erosion in the Mott Canyon watershed (NV-1)?

CEQA

Analysis: *Not Applicable; Proposed Action and Alternatives*

Watershed NV-1 is not in California. With the exception of a small portion of the upper watershed that originates in California, the Mott Creek watershed (NV-1) is located on National Forest Lands in Nevada.

TRPA

Analysis: *Not Applicable; Proposed Action and Alternatives*

Watershed NV-1 is not located in the Lake Tahoe Basin, and is therefore not under the jurisdiction of TRPA.

NEPA

Analysis: *No Adverse Effects; Proposed Action and Alternatives*

Management Practice 30, "Water Quality Maintenance and Improvement," of the Forest Plan applies to watershed NV-1. This management practice prohibits increases in peak and total runoff due to vegetation removal and impervious surface construction. The design features described in Chapter 2 would implement many of the practice standards and guidelines outlined in the Forest Plan and *Soil and Water Conservation Handbook* (USFS 2011) for avoidance of adverse effects.

In watershed NV-1 Project proposals would be the same under the Proposed Action and Alternatives. TRPA allowable land coverage coefficients are not applicable outside of the Lake Tahoe Basin. The Proposed Action and Alternatives would result in approximately 2.7 acres of permanent disturbance for new mountain bike trails in the NV-1 watershed. Temporary disturbance (7.1 acres) and new impervious surfaces (2.7 acres) would affect an additional 1.5 percent of the 643-acre watershed but would not likely result in measurable increases in peak and total runoff amounts for the watershed.

Panorama Trail. This project component would require a maximum of 12,000 square feet of new permanent disturbance in watershed NV-1. The trail would not pose direct effects to the Mott Creek channel. Design features for this project component would be adequate for avoidance and minimization of long-term operational effects to surface runoff and soil erosion.

Mountain Bike Park. The project component would construct a new lift-served mountain bike park through a combination of existing summer access roads and new single-track trails varying in width from six (6) feet for beginner and intermediate trails and (3) feet for advanced trails. New trails would be generally contained within the area bounded by Big Easy Lift, Tamarack Express Lift top station, and Mott Canyon Lift top station. Construction of mountain bike trails would require 2.7 acres of new permanent disturbance and 7.1 acres of temporary disturbance.

Project components would not be located in direct proximity to Mott Creek channel but some mountain bike trails would cross the Mott Creek headwaters area. The six-foot wide beginner mountain bike trails, as currently proposed to the west of the Dipper Express lift, would traverse across Mott Creek headwaters with moderate hydrologic connectivity to the Mott Creek channel. Additionally, a section of intermediate trail (6-foot wide) appears to cross two drainages with moderate hydrologic connectivity at their confluence and then parallel a drainage with higher hydrologic connectivity for a few hundred feet. One crossing of the advanced mountain bike trail (3 to 4-foot wide) is identified down gradient along this same drainage feature.

As currently located, portions of Mountain Bike Park would result in new permanent disturbance and tree removal in the Mott Canyon headwaters in areas of moderate to steep slopes. Field assessments conducted in June 2014 by IERS and HBA staff identified site-specific design measures within the Mountain Bike Park. Design features address areas of realignment during field fitting of trails and increased armoring needs at several drainage crossings. Appendix 3.1-F details these measures, which would further reduce project-level effects to surface runoff and soils erosion.

Summary. Soil disturbance resulting from each project component would be mitigated through application of permanent BMPs and design features illustrated on project proposals and engineering plan, outlined in the on-going MMP, detailed in the on-going CERP, and monitored by the on-going Environmental Monitoring Program. Based on NV-1 BMP implementation and effectiveness evaluations reported in the 2006-2011 CMR and 2012 and 2013 Annual Reports (CardnoEntrix 2012, 2013, 2014), temporary BMPs installed and maintained during construction activities and permanent BMPs installed and maintained as project design features would be effective at minimizing erosion and controlling surface runoff, soil erosion and sediment transport in NV-1.

Implementation of resource protection measures as outlined in the USDA Forest Service Region 5 Water Quality Management Handbook (USFS 2011) along with the design features listed in Chapter 2 and the operations and maintenance plans required by the Forest Service for project-level approval and permitting would avoid potentially adverse direct and indirect effects to water and soil resources. Summer recreation in NV-1 would not adversely affect surface runoff or create new areas of erosion because activities and uses would be conducted in

accordance with law, regulation, policy, Forest Plan standards and guidelines, and project-specific resource protection measures.

This analysis concludes that the Project proposals in NV-1 include resource protection measures and design features that are appropriate and adequate to control erosion on and off-site and stabilize soils during and upon completion of construction and soil disturbance activities. Project-level effects would not result in direct or indirect adverse effects to surface runoff or soil erosion.

IMPACT: WATER-4. Would the Project increase peak and total runoff such that downstream conveyance or storage facilities (creeks, reservoirs, pipes, basins, etc.) no longer have adequate capacity, create new sources of chronic erosion or be located in areas of known chronic soil erosion in the Daggett Creek watershed (NV-2+5)?

CEQA

Analysis: *Not Applicable; Proposed Action and Alternatives*

Watershed NV-2+5 is not in California. The Daggett Creek watershed (NV-2+5) is located on National Forest Lands in Nevada.

TRPA

Analysis: *Not Applicable; Proposed Action and Alternatives*

Watershed NV-2+5 is not located in the Lake Tahoe Basin and is therefore not under the jurisdiction of TRPA.

NEPA

Analysis: *No Adverse Effects; Proposed Action and Alternatives*

Management Practice 30, "Water Quality Maintenance and Improvement," of the Forest Plan applies to watershed NV-2+5. This management practice prohibits increases in peak and total runoff due to vegetation removal and impervious surface construction. The design features described in Chapter 2 would implement many of the practice standards and guidelines outlined in the Forest Plan and *Soil and Water Conservation Handbook* (USFS 2011) for avoidance of adverse effects.

NV-2+5 watershed is 830 acres. The Proposed Action and Alternatives would result in approximately 3.1 acres of new permanent land disturbance for mountain bike trails. Temporary disturbance would be approximately 4.8 acres. Temporary disturbance (4.8 acres) and new permanent disturbance (3.1 acres) would affect approximately 1 percent of the 643-acre watershed and would not result in

measurable increases in peak and total runoff amounts. Runoff would continue to be captured and attenuated in East Peak reservoir to avoid adverse effects to the Daggett Creek channel, which begins at the reservoir outlet.

Panorama Trail. This project component would require a maximum of 17,751 square feet of new permanent soil disturbance in watershed NV-2+5. The trail would cross the watershed above East Peak Lake and not pose direct effects to Daggett Creek. Design features for this project component would be adequate for avoidance and minimization of long-term operational effects to surface runoff and soil erosion.

East Peak Zipline Canopy Tour. This project component would be located a short distance to the east of Big Easy Lift top station in watershed NV-2+5. The zipline would terminate at East Peak Reservoir. The Canopy Tour would require 400 square feet of permanent soil disturbance for queuing areas and 2,400 square feet for access and maintenance trails. Tree removal would be 1.75 acres. The Canopy Tour would increase summer visitor use and associated resort operations and maintenance activities to a previously developed and managed portion of the watershed. Because of its location within the watershed and the above ground configuration, this Canopy Tour is unlikely to cross drainages with significant sediment transport ability or connectivity to Daggett Creek, which begins at the East Peak Reservoir. The hiking/maintenance trails would likely require increased monitoring and maintenance because of location on moderate to steep slopes. Design features for this project component would be adequate for avoidance and minimization of long-term operational effects to surface runoff and soil erosion.

East Peak Lodge Hiking Trail. The hiking trail would connect the Adventure Peak area at the Top of the Gondola (watershed CA-1) to the East Peak Lodge (watershed NV-2+5). The project component would require approximately 12,000 square feet of permanent soil disturbance (1,200 square feet in CA-1 and 10,800 square feet in NV-2+5). Temporary disturbance is estimated at 36,000 square feet (0.83 acres). The hiking trail would increase summer use and associated resort operation and maintenance activities in NV-2+5, but because of its location within the watersheds, the trail is unlikely to cross drainages with significant sediment transport ability or connectivity to Heavenly Valley Creek in CA-1. In watershed NV-2+5, the hiking trail terminates at East Peak Lake and would not adversely affect Daggett Creek channel. Design features for this project component would be adequate for avoidance and minimization of long-term operational effects to surface runoff and soil erosion.

Summary. Soil disturbance resulting from each project component would be mitigated through application of permanent BMPs and design features illustrated on project proposals and engineering plan, outlined in the on-going MMP, detailed in the on-going CERP, and monitored by the on-going Environmental Monitoring Program. Based on NV-2+5 BMP implementation and effectiveness evaluations reported in the 2006-2011 CMR and 2012 and 2013 Annual Reports (CardnoEntrix 2012, 2013, 2014), temporary BMPs installed and maintained

during construction activities and permanent BMPs installed and maintained as project design features would be effective at minimizing erosion and controlling surface runoff, soil erosion, and sediment transport in NV-2+5.

Implementation of resource protection measures as outlined in the USDA Forest Service Region 5 Water Quality Management Handbook (USFS 2011) along with the design features listed in Chapter 2 and the operations and maintenance plans required by the Forest Service for project-level approval and permitting would avoid potentially adverse direct and indirect effects to water and soil resources. Summer recreation in NV-2+5 would not adversely affect surface runoff or create new areas of erosion because activities and uses would be conducted in accordance with law, regulation, policy, Forest Plan standards and guidelines, and project-specific resource protection measures.

This analysis concludes that the Project proposals in NV-2+5 include resource protection measures and design features that are appropriate and adequate to control erosion on and off-site and stabilize soils during and upon completion of construction and soil disturbance activities. Project-level effects would not result in direct or indirect adverse effects to surface runoff or soil erosion.

IMPACT: WATER-5. Would the Project increase peak and total runoff such that downstream conveyance or storage facilities (creeks, reservoirs, pipes, basins, etc.) no longer have adequate capacity, create new sources of chronic erosion or be located in areas of known chronic soil erosion in the Edgewood Creek watersheds (NV-3, EDGE-1, EDGE-2)?

CEQA

Analysis: *Not Applicable; Proposed Action and Alternatives*

Watershed NV-3 is not in California. The Edgewood Creek watershed (NV-3) is located on National Forest Lands and private lands in Nevada.

TRPA

Analysis: *Less than Significant Impact; Proposed Project and Alternatives*

The Heavenly Mountain Resort portion of NV-3 is 408 acres. New permanent disturbance in this watershed would be associated with the Panorama trail, which would be located outside of the special use permit boundary but still traverse National Forest Lands.

The project component would require approximately 9,126 square feet of permanent soil disturbance in NV-3. Temporary disturbance and new land coverage would affect less than 0.5 percent of the 408-acre watershed and would not result in measurable increases in peak and total runoff amounts. The Panorama Trail would not be located in proximity to Edgewood Creek channel.

The trail traverses the watershed above the Edgewood Creek headwaters and would have extremely low hydrologic connectivity.

EDGE-1 and EDGE-2 are unnamed watersheds between CA-7 and NV-3 (Figure 3.1-1). These subwatersheds are approximately 479 and 825 acres, as delineated for the 2007 Lake Tahoe TMDL efforts. These watersheds are tributary to Edgewood Creek and are thus discussed under this Impact analysis. Project components that would be located in this watershed include portions of the Panorama Trail, Mid-Station Canopy Tour, the Mid-station to Panorama Trail connector and the top portion of the Forest Flyer. Project components would be located in a portion of the watersheds with very low hydrologic connectivity to Edgewood Creek.

Summary. Soil disturbance resulting from each project component would be mitigated through application of permanent BMPs and design features illustrated on project proposals and engineering plan, outlined in the on-going MMP, detailed in the on-going CERP, and monitored by the on-going Environmental Monitoring Program. Based on NV-3 BMP implementation and effectiveness evaluations reported in the 2006-2011 CMR and 2012 and 2013 Annual Reports (CardnoEntrix 2012, 2013, 2014), temporary BMPs installed and maintained during construction activities and permanent BMPs installed and maintained as project design features would be effective at infiltrating runoff and controlling soil erosion. TRPA regional water quality goals #1 and #2 would be satisfied.

Implementation of resource protection measures as outlined in the USDA Forest Service Region 5 Water Quality Management Handbook (USFS 2011) along with the design features outlined in Chapter 2 and the operations and maintenance associated plans required by the TRPA and USDA Forest Service for project-level approval and permitting would avoid and minimize potential impacts to soil resources. Summer recreation in watersheds NV-3, EDGE-1 and EDGE-3 would not adversely affect surface runoff or create new areas of chronic erosion because activities and uses would be conducted in accordance with law, regulation, policy, Forest Plan standards and guidelines, and site-specific resource protection measures.

This analysis concludes that the Project proposals in NV-3 include resource protection measures and design features that are appropriate and adequate to control erosion on and off-site and stabilize soils during and upon completion of construction and soil disturbance activities. The project-level effects would be reduced to a level of less than significant.

NEPA

Analysis: *No Adverse Effects; Proposed Action and Alternatives*

Management Practice 30, "Water Quality Maintenance and Improvement," of the Forest Plan applies to watershed NV-3. This management practice prohibits increases in peak and total runoff due to vegetation removal and impervious

surface construction. The design features described in Chapter 2 would implement many of the practice standards and guidelines outlined in the Forest Plan and *Soil and Water Conservation Handbook* (USFS 2011) for avoidance of adverse effects.

Direct and indirect effects from tree removal and temporary and permanent disturbance within the NV-3, EDGE-1 and EDGE-2 watersheds are discussed above under the TRPA analysis.

The analysis concludes that Project proposals on National Forest Lands include design features that are appropriate and adequate to control surface runoff and soil erosion on and off-site and stabilize soils during and upon completion of construction and soil disturbance activities. Summer recreation in watersheds NV-3, EDGE-1 and EDGE-3 would not adversely affect surface runoff or create new areas of chronic erosion because activities and uses would be conducted in accordance with law, regulation, policy, Forest Plan Standards and guidelines, and site-specific resource protection measures. Project-level effects would not result in direct or indirect adverse effects to surface runoff or soil erosion.

3.1-4.3 Proposed Project, Alternative 1 and Alternative 2 – Water Quality

Compliance with TRPA Environmental Thresholds and surface water quality objectives of the TRPA, Lahontan and NDEP is required, but at times is not achieved. Specifically, the TP, TN, Total Iron and Chloride annual average standards have not been regularly achieved, as described in the Environmental Setting.

When analyzing nutrient impacts to ground and surface waters, a number of interactions must be considered, including land use and management practices, geology, topography, soils, climate and atmospheric inputs. TRPA, Lahontan, and NDEP enforce regulations developed to protect water quality of Lake Tahoe and its tributaries. The current standards with which water quality must comply are contained in Lahontan Board Order No. R6T-2003-0032A2, TRPA 208 Water Quality Management Plan, TRPA Code Chapter 60, Standards for Waters Tributary to Lake Tahoe as listed by NDEP. Daggett Creek is held to Nevada State Standards for Class A waters (NAC 445A.124), and Mott Creeks are regulated by narrative tributary standards.

Construction of new summer-use facilities, public hiking trails, mountain bike skills park, mountain bike trails and connectors, and maintenance foot paths would result in the removal of vegetation and disturbance and compaction of soils, which can directly affect soil erosion and water quality constituent concentrations during construction. If disturbed areas are not stabilized and revegetated following construction, unstable conditions could persist.

Construction impacts are avoided and minimized through compliance with state NPDES construction permits and TRPA project permit conditions, which require the implementation of erosion and sediment control structures and monitoring and maintenance of such temporary BMPs throughout the construction period and for overwintering of a project site. Additionally, Heavenly implements the standard design features contained in the on-going CERP for

compliance with Forest Plan management prescriptions and the practices outlined in the USDA Forest Service Soil and Water Conservation Handbook (USFS 2001).

The long-term operation of facilities and trails can result in continued soil and vegetation disturbance, which can lead to accelerated erosion and degradation of beneficial uses of Heavenly Valley, Edgewood, Daggett and Mott Creeks. Erosion and sediment control structures are included as design features of Project proposals. Such permanent BMPs would continue to be monitored for implementation and effectiveness under the requirements of the MPA 07. Indirect effects from Project operations are continually addressed through implementation of the on-going Environmental Monitoring Program, which has objectives to identify, prioritize and treat erosion "hot spots" and to assure effectiveness of permanent BMPs and compliance with ongoing waste discharge and monitoring and reporting requirements. The Environmental Monitoring Program, jointly overseen by TRPA, Lahontan and the Forest Service, includes provisions for requiring corrective actions from Heavenly, including restoration actions, should degradation in surface water quality conditions or beneficial uses be detected.

Chapter 2, Section 2.3.5, outlines trail construction standards and maintenance requirements that are applicable to the Project. Forest Service trail construction requirements tier from the *National Best Management Practices for Water Quality on National Forest System Lands, Volume 1: National Core BMP Technical Guide* to the following manuals and handbooks: FSM 2353, FSH2309.18, FSM 7715.5, FSM 7723, and EM 7720-104. The *Sierra Nevada Forest Plan Amendment (SNFPA) Final Supplemental EIS* outlines the standards and guidelines associated with Riparian Conservation Areas (RCAs) and Critical Aquatic Refuges (CARs) located on National Forest Lands. Project components located within or in the vicinity of Sky Meadows would comply with such standards and guidelines outlined in the SNFPA Record of Decision.

Impact WATER-6 addresses potential project effects to surface water quality for Heavenly Valley Creek, Impact WATER-7 addresses potential project effects to surface water quality for Edgewood Creek, and Impact WATER-8 addresses potential project effects to surface water quality for Mott and Daggett Creeks. These analyses build upon the surface runoff and soil erosion analyses of impacts WATER-1 through WATER-5, which conclude that potential project-level effects would be avoided or minimized to a less than significant level through implementation, on-going monitoring, and proper maintenance of design features and site-specific resource protection measures.

IMPACT: WATER-6: Would Construction and Operation of the Project Lead to Noncompliance with Surface Water Quality Standards and Thresholds in Heavenly Valley Creek?

CEQA

Analysis: *Less than Significant; Proposed Action and Alternatives*

The Proposed Action would implement summer uses and facilities in CA-1. Most project components would be located in the Top of the Gondola/Von Schmidt's flat area, a portion of the CA-1 watershed with low to very low hydrologic connectivity to Heavenly Valley Creek. New impervious surfaces and temporary disturbance associated with the Mid-station Canopy Tour, Sky Cycle Canopy Tour, Forest Flyer Alpine Coaster, Mountain Bike Skills Park, infill activities and

the associated hiking and maintenance trails would have little to no direct effects to surface water quality and beneficial uses in Heavenly Valley Creek.

Project components located in the Sky Basin portion of watershed CA-1 would include the Sky Meadows Zipline Canopy Tour, Sky Meadows Challenge Course, Ridge Run Lookout Tower and Observation Deck, and associated hiking and maintenance trails. These project components would create 25,484 square feet of new permanent disturbance and 3 acres of temporary construction disturbance and tree removal in a portion of CA-1 watershed with moderate to high hydrologic connectivity to Heavenly Valley Creek.

Ridge Run Lookout Tower and Observation Deck. This project component would be located at the top ridge of the watershed and would establish minimal new permanent disturbance. Because of location of the project component in the top of the CA-1 watershed, little to no direct and indirect effects to Heavenly Valley Creek would occur. Design features for this project component would be adequate for protection of surface water quality and beneficial uses in Heavenly Valley Creek.

Sky Meadows Zipline Canopy Tour, Sky Meadows Challenge Course and Hiking and Maintenance Trails. The Canopy Tour and the associated public hiking and maintenance trails would be located in a mostly undeveloped portion of Sky Meadows Basin to the north of Sky Express Lift. The Canopy Tour would result in 0.55 acres of permanent disturbance because most of the project component would be located in the trees, which minimizes soil disturbance; however, 2.96 acres of tree removal would be necessary to establish the zipline corridor. The two to four-foot wide hiking and maintenance trails would traverse across stems of Heavenly Valley Creek headwaters with moderate to high hydrologic connectivity to the perennial stream. The Challenge Course would be located between the existing Sky Deck and the base of Sky Express Lift and would require two short hiking trails for access to the above ground features. Direct effects to Heavenly Valley Creek and Sky Meadows SEZ would include new permanent disturbance (742 square feet of land coverage – 604 square feet in the SEZ) and tree limb removal in Sky Meadows SEZ. This activity would operate year-round. As documented in Chapter 3.4, findings cannot be made for the proposed access trails within the SEZ. Therefore, the Challenge Course access trails will be relocated outside of the SEZ and closer to the existing maintenance road.

Should the Powderbowl Lodge, a MPA 07 project component, be constructed, the existing Sky deck and structure would be removed and these new summer uses would be serviced from a temporary 20 foot by 25 foot tent structure that would be located outside of the Sky Meadows SEZ.

Direct effects to Heavenly Valley Creek surface water quality and beneficial uses from new permanent disturbance and tree removal in Heavenly Valley Creek headwaters would be avoided and minimized through implementation, ongoing monitoring and maintenance of project design features and site-specific resource protection measures. Indirect effects to the Sky Meadows SEZ and Heavenly Valley Creek channel from summer recreational uses in the Sky Meadows, including increased foot traffic, parking, and facility maintenance needs would be

avoided and minimized through implementation of the Sky Basin resource protection measures as discussed under Impact WATER-1. Potential impacts to surface water quality and beneficial uses would be reduced to a level of less than significant. Administration of the on-going Environmental Monitoring Program would continue.

Alternative 1. Alternative 1 would implement the project components described for the Proposed Action and replace the Forest Flyer with the Sky Basin Coaster. This project component would be located generally in the same portion of Sky Basin as the Canopy Zipline Tour. The Coaster would descend 1,250 vertical feet from the top of Tamarack Express Lift via a 7,960 feet in length track to a bottom terminal located immediately adjacent to the existing summer use road way that serves Sky Meadows Lodge and Bathrooms. This Alternative would require 6,656 square feet of permanent land coverage for the Sky Basin Coaster and 2.5 acres of temporary disturbance and tree removal.

Direct and indirect effects would be similar and potentially additive to those discussed for the Canopy Zipline Tour. Under the Alternative, direct effects to Heavenly Valley Creek surface water quality and beneficial uses from new permanent disturbance and tree removal in Heavenly Valley Creek headwaters would be avoided and minimized through implementation, on-going monitoring and maintenance of project design features and permanent BMPs.

Indirect effects to the Sky Meadows SEZ and Heavenly Valley Creek channel from summer recreational uses in the Sky Meadows, including increased foot traffic, parking, and facility maintenance needs would be avoided and minimized through implementation of the Sky Basin resource protection measures as discussed under impact WATER-1. Potential impacts to surface water quality and beneficial uses would be reduced to a level of less than significant.

Alternative 2. Alternative 2 would implement the project components described for the Proposed Action, but would eliminate the Sky Basin Challenge Course. New permanent disturbance, visitor use and long-term operations and maintenance needs in the Sky Meadows area would be reduced under this alternative. The Sky Basin resource protection measures discussed under impact WATER-1 would still be implemented and potential impacts to surface water quality and beneficial uses would be reduced to a level of less than significant.

TRPA

Analysis: *Less Than Significant; Proposed Action and Alternatives*

Within the Lake Tahoe Basin, the water quality of streams and surface water runoff in both California and Nevada is also subject to TRPA regulation. Heavenly Valley is under TRPA jurisdiction and must meet the state and regional water quality standards. The applicable water quality criteria are found in Attachment 2 of the Section 208 Plan, as updated in 1988; the 2011 Threshold Evaluation Report, Chapter 4, Section III; and TRPA Code Chapter 60.

Potential impacts to surface water quality and beneficial uses from the Proposed Action and Alternatives are discussed above under the CEQA analysis. The CEQA analysis concludes that project-level effects to surface water quality and beneficial uses to Heavenly Valley Creek would be reduced to a level of less than significant.

NEPA

Analysis: *No Adverse Effects; Proposed Action and Alternatives*

As the landowner, the Forest Service is a co-discharger with Heavenly Mountain Resort. Compliance with Waste Discharge Permit (Lahontan), environmental thresholds and surface water quality standards of TRPA is required. Potential project-level effects to surface water quality and beneficial uses from the Proposed Action and Alternatives are discussed above under the CEQA analysis. The CEQA analysis concludes that Project proposals would not result in adverse effects to Heavenly Valley Creek surface water quality and beneficial uses.

IMPACT: WATER-7: Would Construction and Operation of the Project Lead to Noncompliance with Surface Water Quality Standards and Thresholds in Edgewood Creek?

CEQA

Analysis: *Not Applicable; Proposed Action and Alternatives*

Watershed NV-3 is not located in California.

TRPA

Analysis: *Less than Significant Impact; Proposed Action and Alternatives*

A section of the Panorama Trail would cross the Edgewood Creek (NV-3) watershed. The trail would cross the upper watershed above the point where the Edgewood Creek channel begins. No direct effects to surface water quality and beneficial uses would occur. Indirect effects would be addressed through appropriate trail location and design installation of permanent BMPs and design features, and on-going trail monitoring and maintenance, as described in Chapter 2, Section 2.3.5. Potential project-level impacts to surface water quality and beneficial uses in Edgewood Creek would be reduced to a level of less than significant.

NEPA

Analysis: *No Adverse Effects; Proposed Action and Alternatives*

As the land owner, the Forest Service is a co-discharger with Heavenly Mountain Resort. Compliance with TRPA environmental thresholds and surface water

quality standards and NDEP narrative water quality objectives is required. Direct and indirect effects to surface water quality and beneficial uses from the Proposed Project and Alternative are discussed in the TRPA analysis. The TRPA analysis concludes that the Proposed Action and Alternatives would not result in adverse effects to surface water quality and beneficial uses in Edgewood Creek.

IMPACT: WATER-8: Would Construction and Operation of the Project Lead to Noncompliance with Surface Water Quality Standards and Thresholds in Mott and Daggett Creeks?

CEQA

Analysis: *Not Applicable; Proposed Action and Alternatives*

Watersheds NV-1 (Mott Creek) and NV-2+5 (South Fork of Daggett Creek) are not located in California.

TRPA

Analysis: *Not Applicable; Proposed Action and Alternatives*

Watersheds NV-1 (Mott Creek) and NV-2+5 (South Fork of Daggett Creek) are outside of the Lake Tahoe Basin and are not under the jurisdiction of TRPA.

NEPA

Analysis: *No Adverse Effects; Proposed Action and Alternatives*

Mott Creek. The Project would construct beginner, intermediate and advanced mountain bike trails across the western portion of the upper Mott Creek watershed. Mott Creek channel begins to form in the lower portion of the watershed containing Mott Canyon Lift. As discussed under impact WATER-3, the six-foot wide beginner and intermediate mountain bike trails are proposed in an area of NV-1 that has sensitive soils and low to moderate hydrologic-connectivity to Mott Creek channel. Project proposals would avoid adverse effects to Mott Creek through implementation of design features and resource protection measures detailed in Chapter 2, Sections 2.3.5 and 2.6.

The Panorama Trail would terminate in the NV-1 watershed. The trail, as proposed, would not result in adverse effects to Mott Creek because of its location within the watershed. Rerouting the Tahoe Rim Trail in the location proposed would not result in adverse effects to Mott Creek.

South Fork of Daggett Creek. The East Peak Zipline Canopy Tour, East Peak Lake Water Activities, Beginner and Intermediate Mountain Bike Trails, and East Peak Lodge Hiking Trail would be located in the portion of the NV-2+5 watershed that drains to East Peak Lake. Direct effects from increased permanent disturbance and tree removal and indirect effects from increased foot traffic, biking, and maintenance regime would be captured and attenuated in the reservoir

to avoid adverse effects to Daggett Creek. Design features for this project component would be adequate for avoidance of adverse effects to Daggett Creek surface water quality and beneficial uses.

East Peak Reservoir Water Activities. Other than a short trail (4 feet wide and 150 feet long) for access to a floating dock, no permanent disturbance is required for the proposed water activities. Uses would consist of non-motorized boating (e.g., kayaking, canoeing, and other non-motorized boating) and fishing. Design features for the access trail would be adequate for avoidance of adverse effects to Daggett Creek surface water quality and beneficial uses.

3.1-4.4 Proposed Project, Alternative 1 and Alternative 2 – Cumulative Watershed Effects

A cumulative impact can result from the incremental impact of the Project when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. (40 CFR § 1508.7) The term "cumulative effect" is often used as a synonym for "cumulative impact," and the Council on Environmental Quality (CEQ) defines "effect" to be the same as "impact" in the context of NEPA (40 C.F.R. 1508.8). The CEQ did not specifically define "watershed impact," but common usage indicates that this refers to any impact that involves water flowing through a landscape, either because water-related resources are impacted or because a change in watershed processes generates the impact.

The Forest Service's *Soil and Water Conservation Handbook* outlines BMP 7.8 – Cumulative Off-site Watershed Effects, which has the objective: to protect the identified beneficial uses of water from the combined effects of multiple management activities which individually may not create unacceptable effects, but collectively may result in degraded water-quality conditions.

TRPA's Ski Area Master Plan Guidelines state on page 20 under planning criteria 9a that "ski trail construction shall not exceed the threshold of concern for each watershed or portion thereof, which is established through the application of the Ski Area Cumulative Watershed Effects Analysis Methodology (TRPA 1991). The overall goals are to preserve watershed conditions and meet applicable water quality standards." Planning criteria 9a applies to Heavenly Mountain Resort watersheds CA-1, CA-7 and NV-3. Although the Project does not include the construction or modification of any new ski trails, this provision is still applied to the Project impacts.

Under CEQA, a proposed project's incremental effects may be "cumulatively considerable" even when its individual effects are limited. [Guidelines §§ 15064(h)(l), 15065(a)(3), 15355(b).] In other words, CEQA does not excuse an EIR from evaluating cumulative impacts simply because the project-specific analysis determined its impacts would be "less than significant." Similarly, a "less than significant" impact conclusion at the project-level does not guarantee the project's contribution to a significant cumulative impact will be less than "cumulatively considerable."

All cumulative watershed effects (CWE) analytical methods are based on models of natural processes. A 'model" is a mathematical or qualitative representation of nature and serve to provide answers to the question: What watershed changes are anticipated as a result of an action? (Elliot et al. 2010) A critical step in cumulative effects analysis, as stated by MacDonald (2000) is to compare the current condition of the resource (in this case, water resources of each of the stated watersheds) and the projected changes due to management (i.e. total permanent disturbance). These tools provide an estimate of the relative magnitude of change from a proposed action, which can be compared to established watershed thresholds, to determine if the proposed action, in the context of past, present and reasonably foreseeable future actions, could result in overall degradation of watershed condition. Since these tools are providing estimated levels of disturbance, they are always used in conjunction with available watershed condition monitoring data, to provide a complete cumulative watershed affects analysis.

The *Heavenly Ski Area CWE Analysis* (Holland 1994) provides the Procedural Overview for the development of the cumulative watershed effects modeled analysis that was initiated for the MP 96 and updated for the MPA 07. Appendix 2-D of the MPA 07 EIR/EIS/EIS details the determination of the watershed Thresholds of Concern (TOC), equivalent roaded area (ERA) definitions and calculations and prior model assumptions and procedures. Prior Heavenly CWE analyses used the modified universal soil loss equation, commonly referred to as MUSLE, to estimate the total sediment delivered to a stream or channel, expressed in tons per year, as would be used for a specific road, ski run segment, or ground-disturbing activity. The equation predicts soil loss per acre of land surface and sediment delivery to a water body.

The CWE analysis included in the MPA 07 did not evaluate the Epic Discovery Project proposals. Accordingly, this CWE analysis updates the MUSLE-based CWE analysis presented in the MPA 07.

Compared to current modeling tools in the field of watershed analysis, which predict actual soil loss, the Heavenly MUSLE model would be considered outdated, providing a low level of confidence in predicted results. A more current erosion prediction model was considered, the LSPC, Loading Simulation Program in C++, developed by the US EPA (http://www.epa.gov/athens/wwqtsc/html/lspc.html) and calibrated for the Tahoe Basin Lahontan and NDEP 2010). However, because the actual area of ground disturbance proposed in the Project is so small for each of the given watersheds, predicted change would be well below the confidence limit even with the improved accuracy of more modern runoff and erosion prediction tools. Therefore, instead of using a complex erosion prediction model, the Lead Agency representatives selected a simpler approach to quantify the change in total permanent disturbance for comparison to the established threshold for permanent disturbance for each watershed. This approach has been utilized by the Forest Service for CWE analysis for the past two decades and involves utilizing established coefficients to convert land disturbing activities into equivalent roaded acres (ERAs), or stated another way, an equivalent area that allows zero infiltration.

The ERA approach developed by the Forest Service was applied to estimate the effects of past and new land management disturbances within watersheds CA-1, CA-7, Edge-1, Edge-2, NV-1, NV-3 and NV-2+5. The ERA approach serves as a preliminary indicator for decision-makers to determine whether or not land management disturbance in a given watershed may approach or exceed the establish Threshold of Concern (TOC) for impervious land coverage. The TOC is an estimated upper limit, as set by the permitting agencies, of total disturbance that does not allow

infiltration of runoff, that a watershed can tolerate without adverse impacts to overall watershed and stream channel stability. TOCs were established for each watershed for the MP 96 to express the capacity of the watershed to assimilate permanent disturbance. Some watersheds are particularly sensitive to compaction of soils and loss of infiltration capacity, which leads to a low TOC, while more resilient watersheds have a higher TOC. Table 3.1-9 presents the TOCs that were developed by an interdisciplinary team of qualified professionals in 1993.

In general the ERA is calculated using the following formula:

ERA = [Acres of Impervious Surface/Permanent Disturbance] x [Disturbance Coefficient Specific to the Type of Disturbance]

%ERA is the summation of ERAs divided by watershed area. Forest Service staff provided the following ERA coefficients for the disturbance types relevant to this Project:

- Ski Trail, flush cut and natural 0.10
- Ski Trail, logged and graded 0.20
- Roads and Trails 1.0
- Structures/Buildings/Facilities 0.8

Ski trial coefficients are representative of different disturbance regimes. Older ski trails at Heavenly were typically logged and graded, representing a more disturbed condition (coefficient of 0.20) than more recently constructed ski trail, which involve removing trees over the snow and retaining existing ground cover of rocks and ground vegetation (coefficient of 0.10). Unpaved roads and trails are treated as direct acreage. A coefficient of 0.80 is applied to structures, buildings, and facilities with associated permanent land coverage, representative of beneficial effects of the permanent erosion and sediment control BMPs constructed and maintained as part of the structure or facility.

Table 3.1-9 presents ERA estimates by watershed for 2013 existing conditions, proposed conditions (Proposed Action ERA added to existing conditions) and cumulative conditions (Proposed Action ERA added to MPA 07 ERAs at build out). Appendix 3.1-E contains the disturbance files used to calculated ERAs. ERAs that approach or exceed a given watershed's defined TOC would trigger field verification and monitoring to ascertain whether cumulative watershed effects are actually present and if restoration activities are necessary. The MPA 07 mitigation measure 7.5-1 provides for monitoring that detects when further restoration activities would be triggered.

Table 3.1-9

Existing, Proposed, and Cumulative %ERA by Watershed

Watershed	Area (Acres)	Threshold of Concern (TOC)	MPA 07 %ERA[1]	2013 Existing Conditions %ERA	Epic Discovery Project %ERA	2013 Existing Conditions %ERA + Epic Discovery Project %ERA	MPA 07 %ERA[2] + Project %ERA
CA-1*	1564	5%	4.29	3.99	0.3	4.29	4.49
CA-7*	307	7%	1.09	0.71	0.10	0.81	1.19
NV-1	643	4%	3.80	3.37	0.44	3.81	4.24
NV-3*	408	5%	5.57	5.48	0.04	5.52	5.61
Edge-1*	479	ND	ND	0.53	0.08	0.61	0.61
Edge-2*	825	ND	ND	4.72	0.05	4.77	4.77
NV-2+5	829	7%	5.30	3.92	0.40	4.32	5.70

Source: Dr Mark Grismer and IERS 2014

Notes:
* Indicates the watershed is within the Lake Tahoe Region
[1] Represents Buildout of all MPA 07 projects including those projects that would remove or decrease permanent disturbance
[2] Represents Buildout of all MPA 07 projects and Epic Discovery Project

IMPACT: WATER-C1: Would the Project have significant cumulative impacts to water resources in watershed CA-1?

CEQA and TRPA

Analysis: *Cumulatively Considerable; No Action, Proposed Action and Alternatives*

Cumulative Project List. The following projects are considered as past, present or reasonably foreseeable future actions in and downstream of the CA-1 watershed: MPA 07 project components; South Tahoe Public Utility District facilities maintenance and upgrades; Trout Creek Bridge to Ski Run Highway 50 Improvements; conservation and restoration projects in the Trout Creek watershed; South Tahoe Greenway Shared-Use Trail Project; El Dorado County road and BMP maintenance projects; Powerline Bike Trail; and Heavenly Valley Creek Fuels Reduction Project.

Cumulative Effect(s) of Concern. There is the potential for increase in magnitude, duration or frequency of an existing adverse biotic condition. Cumulative %ERA would approach the watershed TOC.

Past and Current Conditions. Past conditions have been well documented and reported in the Heavenly Valley Creek TMDL Staff Report (Lahontan 2000), the MPA 07 EIR/EIS/EIS and the MP 96 EIR/EIS/EIS. Current watershed conditions are summarized in Section 3.1-2.2. Overall current watershed condition is rated as Good with a Stable trend, however, the poor score for biotic health (as measured by benthic macroinvertebrates (BMI)) in the Sky Meadows reach, does raise a flag for a potential cumulative watershed impact in the watershed above Sky Meadows.

Past ski area development that began in the 1950's created changes in peak and total runoff, soil quality, vegetation, topography and stream channel morphology in the CA-1 watershed and headwaters of Heavenly Valley Creek. On-site impacts to resources resulted. The MP 96 EIR/EIS/EIS analyses recognized the adverse effects of past activities on resource impact severity and as a result a number of watershed level mitigations were prescribed, including the on-going CWE Restoration Program, CERP, and Environmental Monitoring Program.

On-going monitoring of physical, chemical and biological indicators of watershed health reports improvements in most indicators. Watershed conditions have markedly improved over the last several decades as a result of changes in ski area operations and management, road decommissioning, application, monitoring and maintenance of permanent BMPs, and wide-scale revegetation of ski runs and road cut and fill slopes. Stream condition inventories report stable channel conditions that are within the range of natural variability and comparable to reference conditions. Surface water quality monitoring results indicate improved compliance with state annual standards and on-going compliance with the sediment TMDL five-year rolling average numeric target. Biotic conditions however, do not yet approach desired conditions described below.

Desired Condition. The numeric targets developed for the Heavenly Valley Creek sediment TMDL are intended to interpret the narrative and numeric water quality objectives, which in turn provide for support of designated beneficial uses.

Desired conditions for Heavenly Valley Creek include:

Suspended sediment concentrations: The numeric target is an annual mean suspended sediment concentration at the "Property Line" station, expressed as a 5 year rolling average, no greater than that observed in the reference stream, Hidden Valley Creek.

Total instream sediment load: The numerical target for total instream sediment loading in Heavenly Valley Creek is 58 tons/year, expressed as a five year rolling average as measured at the Property Line monitoring station. This number reflects the modeled maximum feasible reduction in sediment leading with full application of BMPs to the watershed. It is believed to be close to natural conditions and reasonably comparable with the estimated 45 tons/year total sediment load in Hidden Valley Creek.

Stream condition index and stability: Over time, Heavenly Valley Creek should show a trend of increasing stability in channel morphology.

Macroinvertebrate community health: Over time, there should be improving trends in benthic macroinvertebrate community metrics, approaching conditions in Hidden Valley Creek.

Watershed disturbance: Schedules in ski resort master plan mitigation program for implementing and maintaining BMPs for roads and ski runs are met, with progress and BMP effectiveness reported annually and evaluated at 5-year intervals.

Effective soil cover (vegetation, woody debris, organic matter, rocks) on ski runs and roads: Cover meets modeled mitigation targets set for specific road/run segments in watershed, and overall cover rating is "Good" or better using LTBMU evaluation criteria.

Range of Variability. There is inherent seasonal and annual variation in sediment delivery to streams, and in the impacts of sediment on aquatic species during different critical life stages. The Heavenly Valley Creek TMDL addresses long term erosion patterns and instream impacts by using longer time frames for implementation and evaluation, and relies on an adaptive management approach. Load allocations are expressed as 5 year rolling averages to account for seasonal and annual variability. The TMDL and allocations are expected to promote recovery of aquatic habitat over time to the point, which will support the beneficial uses of concern. The TMDL contains an implicit margin of safety, based on conservative assumptions, to compensate for uncertainty in the analysis, and to ensure that the allocations, when achieved, will result in attainment of standards.

Threshold of Concern/Existing, Proposed and Potential Cumulative %ERAs. The TOC for watershed CA-1 is set at 5%. Existing %ERA for watershed CA-1 is 3.99%. Implementation of the Proposed Project and Alternative 2 would increase the %ERA by 0.30 to 4.29%. Alternative 1 would increase %ERA by 0.41 to 4.40%. When considering new summer uses and facilities as additive to those actions approved for the MPA 07, the %ERA upon build out is estimated at 4.49%. Cumulative %ERA would approach but not exceed the numerical watershed TOC. This %ERA is representative of on-site effects of total disturbance within the Heavenly special use permit area of CA-1.

Potential for Cumulative Watershed Effects. As the %ERA approaches the TOC, the risk for cumulative watershed effects in watershed CA-1 increases. Although the Project impacts would be avoided and minimized through design features and site-specific resource protection measures and the Project would not result in a significant increase in impact over existing conditions. However, the Sky Basin has recent in-stream BMI scores that indicate poor biotic conditions. Although the significance of these results is being assessed as part of the on going Environmental Monitoring Program, the data indicate that there is an existing impaired condition for in-stream biotic condition. As such, new summer uses and facilities in the Sky Basin when considered in the context of past, present, and reasonably foreseeable future actions in the CA-1 watershed could perpetuate an existing impaired biotic condition in Sky Meadows.

Cumulative increases in impact severity can occur if an existing adverse condition increases in magnitude, duration or frequency (Reid 2010). The potential for cumulative off-site watershed effects in this watershed is high. There is potential for continued cumulative off-site watershed effects as reflected by biotic health within this watershed, and currently there is not a high level of certainty regarding which restoration strategies will be effective in improving biotic condition scores. There is a need to increase monitoring efforts in this watershed to provide information for effective restoration and mitigation strategies over the long term. The discussion below provides the most current assessment of restoration and mitigation strategies that should be implemented at this time.

Restoration and Mitigation Strategies. The on-going CWE Restoration Program (Appendix 3.1-D) outlines projects for mitigation of past ski area development impacts, as identified in the MPA 07 mitigation and monitoring program. Heavenly would continue to implement restoration projects as capital projects are constructed. On-going monitoring would continue to identify and prioritize high risk areas for restoration and maintenance.

As part of the analysis conducted for the Project an assessment of primary sources of erosion was completed in July 2014 in the CA-1 watershed above the Sky Reservoir. Appendix 3.1-F details the erosion-focused monitoring results and outlines the recommended mitigation measures to reduce sources of fine sediments that may be contributing to low scores of in-channel biotic health and downstream sediment impacts.

In addition, future road management, including design, maintenance and monitoring of resort access roads, will be conducted as described in Chapter 2, Section 2.3.5. The Special Use permit between Heavenly Resort and the Forest Service will be amended to incorporate these changes to roads management at Heavenly to ensure these activities are conducted to the same standards as the rest of the Forest Service road network.

The on-going Environmental Monitoring Program implemented in compliance with Lahontan's WDR monitoring and reporting program will be amended to include expanded stream channel condition monitoring in the Sky Meadows reach to better determine the cause of poor biotic condition scores and document future trends. The actual metrics and protocols to be added will be determined through an interagency effort led by Lahontan to revise the existing WDRs.

Appendix 3.1-F details the erosion-focused monitoring results and outlines the recommended mitigation measures. The potential for off-site impacts would be attenuated by the existing Sky Reservoir, but sediment-focused mitigation and monitoring of on-site cumulative watershed effects in Sky Meadows would be necessary to reduce existing impact intensity of erosion and sedimentation in the upper watershed. The implementation of restoration and mitigation actions planned in the MPA 07 mitigation and monitoring program and those proposed for the No Action, Proposed Action and Alternatives in mitigation measure WATER-C1a and WATER-C1b below would reduce cumulative impacts to level of less than significant.

Relationship to the Lake Tahoe TMDL. Current monitoring data indicates that this watershed is meeting the thresholds for suspended sediment as described in the Heavenly TMDL for this metric (Section 3.1-2.3). The proposed 2.1 acres of new permanent disturbance is not expected to change this trend. Annual suspended sediment loads may continue to decrease even further below established TMDL thresholds, as a result of proposed mitigation measures, including those to reduce fine sediment impacts that are likely affecting current biotic health in the Sky Meadows Reach.

NEPA

Analysis: *Potential Adverse Effects; No Action, Proposed Action and Alternative*

The management practices, standards and guidelines of the Forest Plan apply to all Heavenly watersheds. Additionally, NEPA requires a cumulative effects analysis. The Heavenly Ski Area CWE Analysis was first developed in the 1990's as a tool to address the cumulative watershed effects analysis outlined in the TRPA Ski Area Master Plan Guidelines. The procedure for evaluating the cumulative effects of Heavenly Mountain Resort is based on criteria set forth in the Soil and Water Conservation Handbook (Forest Service Handbook 2509.22). Chapter 20 of this Handbook offers a complete description of the authority, objectives and policies of the Forest Service's Cumulative off-site Watershed Effects (CWE) Analysis. The Forest Service's *Soil and Water Conservation Handbook* outlines BMP 7.8 – Cumulative Off-site Watershed Effects, which has the objective: to protect the identified beneficial uses of water from the combined effects of multiple management activities which individually may not create unacceptable effects, but collectively may result in degraded water-quality conditions.

As described in Chapter 2, Section 2.3.5, planning of future road maintenance and retrofit activities will be done in coordination with Forest Service staff to ensure activities are being conducted and tracked in accordance with current US Forest protocols, as the rest of the LTBMU road network. An annual road maintenance and retrofit plan will be submitted to the Forest Service for review and input and information will be provided to the Forest Service for documentation and tracking in agency databases.

As discussed above for the CEQA and TRPA analyses, adverse cumulative effects of past, present and reasonably foreseeable future actions could perpetuate the current impaired biotic condition documented within Sky Meadows, which is a potential indicator of cumulative watershed effect.

The on-going Environmental Monitoring Program implemented in compliance with Lahontan's WDR monitoring and reporting program will be amended to include expanded stream channel condition monitoring in the Sky Meadows reach to better determine the cause of poor biotic condition scores and document future trends. The actual metrics and protocols to be added will be determined through an interagency effort led by Lahontan to revise the existing WDRs.

Appendix 3.1-F details the erosion-focused monitoring results and outlines the recommended mitigation measures. The potential for off-site impacts would be attenuated by the existing Sky Reservoir, but sediment-focused mitigation and monitoring of on-site cumulative watershed effects in Sky Meadows would be necessary to reduce existing impact intensity of erosion and sedimentation in the upper watershed. The implementation of restoration and mitigation actions planned in the MPA 07 mitigation and monitoring program and those proposed for the Proposed Action and Alternatives in mitigation measure WATER-C1a and WATER-C1b below are expected to result in no adverse cumulative watershed impact, as measured through the ongoing Environmental Monitoring program.

Mitigation: **WATER-C1a: CA-1 ERA and Erosion Reduction Measures**

Prior to or concurrent with new permanent or temporary disturbance in the Sky Basin, the highest risk (i.e., those with the greatest potential for sediment loading to a channel) sources of erosion or "hotspots" that would have a direct effect on Heavenly Valley Creek channel and BMI scores shall be mitigated, as outlined in Appendix 3.1-F. First phase hotspots shall be addressed prior to new disturbance and shall include numbers 31, 32, 33, 34, 35, 36 and 49, as based on combinations of high erosion risk, high connectivity and/or close proximity to the channel and/or SEZ. Phase two hotspots shall be addressed prior to or concurrent with new disturbance and shall include numbers 13, 30, 37, 38, 41, 42, 43, 44, 45 and 46 because of combinations of high connectivity, but moderate erosion risk or lower proximity to the channel and/or SEZ. Hotspots numbers 6, 7, 39, 40, 47 and 48 shall be retained and implemented as part of the MPA 07 Mitigation Monitoring Program's mitigation measure 7.5-1 (ongoing CWE Restoration Program) to correct areas of chronic sources of erosion that pose lower risk of sediment transport to the channel and/or SEZ. The status of implementation and effectiveness of these mitigation measures shall be documented through mitigation measure 7.5-2 (ongoing Environmental Monitoring Program) and reported to TRPA, Forest Service and Lahontan in annual monitoring reports

WATER-C1b: Amendment to MPA 07 Mitigation Measure 7.5-2, Environmental Monitoring Program

Existing MPA 07 Mitigation Measure 7.5-2 shall be amended to include the following monitoring components and applicable protocols. The Environmental Monitoring Plan shall be updated for 2015 through an amendment of the Lahontan WDR as follows:

- Roads and trails monitoring within the Heavenly special use permit boundary shall be amended to comply with current Forest Service protocols, including the mountain bike trails constructed as part of the Mountain Bike Park in the Mott Creek Watershed (applies only to NV-1). Other general use mountain bike and hiking and maintenance trails would not be components of the Environmental Monitoring program, but on-going effectiveness of design features shall be monitored and maintained through the current Heavenly operations and maintenance program.

- For the Heavenly Valley Creek Sky Meadows Reach only, the stream channel condition monitoring component shall be amended to add a more robust protocol for measuring in-stream fine sediment and in-stream temperature monitoring to provide a better assessment of causes of poor biotic health and document effectiveness of mitigation strategies.
- The Forest Service Region 5 Stream Condition Inventory (SCI) pebble count protocol shall conform to State Water Ambient Monitoring Program (SWAMP) protocols. This protocol shall apply to SCI reaches established in Heavenly Mountain Resort watersheds and the Hidden Valley Creek reference watershed.

CEQA and TRPA

After Mitigations: *Less than Significant; No Action, Proposed Action and Alternatives*

Implementation of mitigation measure WATER-C1a will commence prior to or concurrent with additional development within the Sky Basin, addressing potential and active sediment sources with high hydrologic connectivity to Heavenly Valley Creek. Mitigation measure WATER-C1b amends the on-going monitoring program to include roads and trails monitoring to comply with current Forest Service protocols, adds site-specific requirements for additional substrate analysis for Heavenly Valley Creek and updates SCI pebble count protocols to conform to SWAMP protocols for all Heavenly SCI reaches, including Hidden Valley Creek reference reaches. Mitigations will inform and focus the required management and restoration actions to improve biotic conditions in the Sky Meadows. Mitigations will inform and focus the required management and restoration actions to address high risk areas of erosion, reduce watershed %ERAs, and conduct on-going road and trail maintenance to reduce cumulatively considerable impacts to a less than significant level.

NEPA

After Mitigations: *No Adverse Effects; No Action, Proposed Action and Alternatives*

Implementation of mitigation measure WATER-C1a will commence prior to or concurrent with additional development within the Sky Basin, addressing potential and active sediment sources with high hydrologic connectivity to Heavenly Valley Creek. Mitigation measure WATER-C1b amends the on-going monitoring program to include roads and trails monitoring to comply with current Forest Service protocols, adds site-specific requirements for additional substrate analysis for Heavenly Valley Creek and updates SCI pebble count protocols to conform to SWAMP protocols for all Heavenly SCI reaches, including Hidden Valley Creek reference reaches. Mitigations will inform and focus the required management and restoration actions to improve biotic conditions in the Sky Meadow. Mitigations will inform and focus the required management and

restoration actions to address high risk areas of erosion, reduce watershed %ERAs, and conduct on-going road and trail maintenance to avoid potential cumulatively adverse effects.

IMPACT: WATER-C2: Would the Project have significant cumulative impacts to water resources in watershed CA-7?

CEQA and TRPA

Analysis: *Less than Significant; No Action, Proposed Action and Alternatives*

Cumulative Project List. The following projects are considered as past, present or reasonably foreseeable future actions in the CA-7 watershed: MPA 07 Projects; Tourist Core Area Plan; Project Three Redevelopment; Van Sickle Bi-State Park; and US 50/South Shore Community Revitalization Project (Loop Road).

Cumulative Effect(s) of Concern. Excess impervious surface in the lower watershed.

Past and Current Conditions. Prior to ski area development the upper and middle portions of the CA-7 watershed was generally undisturbed. The lower watershed has contained extensive impervious surfaces from roads, buildings and utilities in the Stateline area. Current watershed conditions are summarized in Section 3.1-2.2 for CA-7. Current watershed condition is rated as Excellent with a Stable trend.

Desired Condition: Desired conditions include %ERA that remains below the watershed TOC.

Threshold of Concern/Existing, Proposed and Cumulative %ERAs. The watershed TOC for CA-7 is set at 7%. Existing %ERA for watershed CA-7 is 0.71%. Implementation of the Project would increase the %ERA by 0.10 to 0.81%. When considering new summer uses and facilities as additive to those actions approved for the MPA 07, the %ERA upon build out is estimated at 1.19%. Cumulative %ERA would not exceed the numerical watershed TOC. This %ERA is representative of on-site effects of total disturbance within the Heavenly special use permit area of CA-7.

Potential for Cumulative Watershed Effects. The CA-7 watershed TOC was set at 7% because this watershed was determined to have less sensitivity to disturbance and low hydrologic connectivity to stream channels. The potential for cumulative off-site watershed effects in this watershed is very low. No off-site adverse cumulative effects would occur in watershed CA-7 from implementation of the Project when considered in the context of other past, present, and reasonably foreseeable future actions.

Restoration and Mitigation Strategies. The on-going CWE Restoration Program (Appendix 3.1-D) outlines projects identified in MPA 07 EIR/EIS/EIS for mitigation of past ski area development impacts. Heavenly would continue to

implement restoration projects as capital projects are constructed. On-going monitoring would continue to identify and prioritize areas for restoration and maintenance.

Relationship to the Lake Tahoe TMDL. The approximately 1,800 square feet of new permanent disturbance in the forested uplands of the CA-7 watershed would be offset by restoration and land coverage reductions achieved through USFS initiatives located on National Forest Lands in the Lake Tahoe Basin.

NEPA

Analysis: *No Adverse Cumulative Effects; No Action, Proposed Action and Alternatives*

The management practices, standards and guidelines of the Forest Plan apply to all Heavenly watersheds. Additionally, NEPA requires a cumulative effects analysis. The Heavenly Ski Area CWE Analysis was first developed in the 1990's as a tool to address the cumulative watershed effects analysis outlined in the TRPA Ski Area Master Plan Guidelines. The procedure for evaluating the cumulative effects of Heavenly Mountain Resort is based on criteria set forth in the Soil and Water Conservation Handbook (Forest Service Handbook 2509.22). Chapter 20 of this Handbook offers a complete description of the authority, objectives and policies of the Forest Service's Cumulative off-site Watershed Effects (CWE) Analysis. The Forest Service's *Soil and Water Conservation Handbook* outlines BMP 7.8 – Cumulative Off-site Watershed Effects, which has the objective: to protect the identified beneficial uses of water from the combined effects of multiple management activities which individually may not create unacceptable effects, but collectively may result in degraded water-quality conditions.

As described in Chapter 2, Section 2.3.5, planning of future road maintenance and retrofit activities will be done in coordination with Forest Service staff to ensure activities are being conducted and tracked in accordance with current US Forest protocols, as the rest of the LTBMU road network. An annual road maintenance and retrofit plan will be submitted to the Forest Service for review and input and information will be provided to the Forest Service for documentation and tracking in agency databases.

As discussed above for the CEQA and TRPA analyses, no adverse cumulative effects of past, present and reasonably foreseeable future actions would occur in CA-7.

IMPACT: WATER-C3: Would the Project have significant cumulative impacts to water resources in watershed NV-1?

CEQA and TRPA

Analysis: *Not Applicable; No Action, Proposed Action and Alternatives*

NEPA

Analysis: *Potential Adverse Effects; No Action, Proposed Action and Alternatives*

Cumulative Project List. The following projects are considered as past, present or reasonably foreseeable future actions in the NV-1 watershed: MPA 07 projects and Tahoe Rim Trail on-going maintenance.

Cumulative Effect(s) of Concern. Percent ERA that exceeds the watershed TOC.

Past and Current Conditions. Past ski area development consisting of constructed ski runs, access roads and ski lift facilities in the Mott Creek watershed. Mott and Killebrew Canyons remain steep natural chutes with no vegetation removal. The exception is the area around Mott Ski Lift base. The Tahoe Rim Trail traverses through the watershed with one crossing of Mott Creek. Section 3.1-2.2 summarizes current watershed conditions for NV-1. Current watershed condition is rated as Good with a Stable trend.

Desired Condition: Desired conditions include: %ERA that remains below the watershed TOC and maintenance of stable channel condition.

Threshold of Concern/Existing, Proposed and Cumulative %ERAs. The watershed TOC for NV-1 is set at 4%. Existing %ERA for watershed NV-1 is 3.37%. Implementation of the Project would increase the %ERA by 0.44 to 3.81%. When considering new summer uses and facilities as additive to those actions approved for the MPA 07, the %ERA upon buildout is estimated at 4.24%. Cumulative %ERA would exceed the numerical watershed TOC. This %ERA is representative of on-site effects of total disturbance within the Heavenly special use permit area of NV-1.

Potential for Cumulative Watershed Effects. The NV-1 watershed TOC was set at 4% because this watershed was determined to have high sensitivity to disturbance, Off-site effects would be avoided by reducing on-site effects.

Restoration and Mitigation Strategies. The on-going CWE Restoration Program (Appendix 3.1-D) outlines projects identified in MPA 07 EIR/EIS/EIS for mitigation of past ski area development impacts. Heavenly would continue to implement restoration projects as capital projects are constructed. On-going monitoring would continue to identify and prioritize areas for restoration and maintenance.

The MPA 07 Mitigation and Monitoring Program restricts additional development in this watershed until compliance with the CWE Restoration Program is achieved. On-going CWE Restoration Program (Appendix 3.1-D) commitments in the NV-1 watershed include the following restoration projects:

- Revegetation and general maintenance of man-made ski runs in NV-1 (On-going);
- Revegetation and maintenance of ski run V4 (Big Dipper) upon construction of ski run V11;

- Construct Sand Dunes access road to LTBMU road specifications;
- Decommission Orion's Road (road segments R594-R596);
- Improve drainage crossing to Mott Lift Base (road segments R622-R627) and post-project road maintenance; and
- Decommission road segments to Mott Lift Top station upon replacement of lift and relocation (road segments R616-R617).

Road improvements and decommissioning were not completed because the corresponding capital improvements were not constructed; Mott Canyon Lift has not been replaced and relocated outside of the Mott Creek Riparian Conservation Area (RCA) and Sand Dunes Lodge and access road has not been constructed.

To assess existing conditions in the NV-1 watershed and field verify monitoring results and conclusions, IERS and HBA staff completed an erosion-focused rapid assessment in June 2014. HBA staff and LTBMU staff also completed a modified Stream Condition Inventory evaluation to revisit bank stability ratings. Banks are determined to be stable.

Field assessment identified the primary sources of erosion in the NV-1 watershed and verified GIS flow accumulation mapping of hydrologic connectivity to surface water for determination of sediment transport probability to Mott Canyon and Mott Creek. Results are reported in Appendix 3.1-G and include mitigation actions that could serve to replace or augment MPA 07 CWE Restoration Program projects that are connected to capital projects that would not likely be implemented in the near-term. Mitigations would include stabilization of erosion hot spots with high connectivity to the proposed mountain bike trails and the removal of a 1390 linear foot road segment that was installed to construct the Avalauncher that is necessary for management of avalanche danger in Killebrew Canyon. This existing facility is accessed during winter operations and the access road is unneeded to conduct summer operations. Decommissioning would follow Forest Service restoration measures for construction disturbance, as described in Chapter 2, Section 2.3.5, removing 12,340 square feet of permanent disturbance in NV-1 and reducing calculated ERAs by 0.28%.

Chapter 2, Section 2.3.5, presents the protocols for field fitting the proposed Epic Discovery mountain bike park trails as part of a Draft Construction Plan. The Draft Maintenance Plan will outline the monitoring and maintenance approach for this project component. In addition to these plans, the design features detailed in Appendix 3.1-G are incorporated into mountain bike park proposals for avoidance and minimization of direct and indirect effects to surface runoff and soil erosion in the NV-1 watershed.

Mitigation: **WATER-C3: NV-1 ERA and Erosion Reduction Measures**

Prior to new permanent or temporary disturbance in the Mott Creek watershed (NV-1), the highest risk (i.e., those with the greatest potential for sediment loading to a channel) sources of erosion or "hotspots", numbers 1, 3, 4, 5 and 6 as outlined in Appendix 3.1-G shall be implemented. Hotspot numbers 7, 8, 9, 10,

11, 13, 16, 20, 21, 22, 23 and 24 shall be addressed during field fitting and phased construction of the proposed mountain bike trails. Those lower risk hotspots 2, 12, 14, 15, 17, 18 and 19 shall be retained and implemented as part of the MPA 07 Mitigation Monitoring Program's mitigation measure 7.5-1 (ongoing CWE Restoration Program). The status of implementation and effectiveness of these mitigation measures shall be documented through mitigation measure 7.5-2 (ongoing Environmental Monitoring Program) and reported to TRPA, Forest Service and Lahontan in annual monitoring reports.

WATER-C1b: Amendments to Mitigation Measure 7.5-2, Environmental Monitoring Program

Existing MPA 07 Mitigation Measure 7.5-2 shall be amended to include the following monitoring components and applicable protocols. The Environmental Monitoring Plan will be updated for 2015 through an amendment of the Lahontan WDR as follows:

- Roads and trails monitoring within the Heavenly special use permit boundary shall be amended to comply with current Forest Service protocols, including the mountain bike trails constructed as part of the Mountain Bike Park in the Mott Creek Watershed (applies only to NV-1). Other general use mountain bike and hiking and maintenance trails would not be components of the Environmental Monitoring program, but on-going effectiveness of design features shall be monitored and maintained through the current Heavenly operations and maintenance program.
- (Not Applicable to NV-1) For the Heavenly Valley Creek Sky Meadows Reach only, the stream channel condition monitoring component shall be amended to add a more robust protocol for measuring in-stream fine sediment and in-stream temperature monitoring to provide a better assessment of causes of poor biotic health and document effectiveness of mitigation strategies.
- The Forest Service Region 5 Stream Condition Inventory (SCI) pebble count protocol shall conform to State Water Ambient Monitoring Program (SWAMP) protocols. This protocol shall apply to SCI reaches established in Heavenly Mountain Resort watersheds and the Hidden Valley Creek reference watershed.

CEQA and TRPA

After Mitigations: *Not Applicable; No Action, Proposed Action and Alternatives*

NEPA

After Mitigations: *No Adverse Effects; No Action, Proposed Action and Alternatives*

Implementation of mitigation measure WATER-C3 will commence prior to or concurrent with additional development within watershed NV-1, addressing potential and active sediment sources with high hydrologic connectivity to the potential mountain bike trails or Mott Creek channel. Mitigation measure WATER-C1b amends the on-going monitoring program to include roads and trails monitoring that complies with current Forest Service protocols and updates SCI pebble count protocols to conform to SWAMP protocols for all Heavenly SCI reaches, including Hidden Valley Creek reference reaches. Mitigations will inform and focus the required management and restoration actions to address high risk areas of erosion, reduce watershed %ERAs, and conduct on-going road and trail maintenance to avoid potential cumulatively adverse effects.

IMPACT: WATER-C4: Would the Project have significant cumulative impacts to water resources in watershed NV-2+5?

CEQA and TRPA

Analysis: *Not Applicable; Proposed Action and Alternatives*

NEPA

Analysis: *No Adverse Effects; Proposed Action and Alternatives*

Cumulative Project List. The following projects are considered as past, present or reasonably foreseeable future actions in the NV-2+5 watershed: MPA 07 projects and Kingsbury Grade road maintenance projects.

Cumulative Effect(s) of Concern. None identified.

Past and Current Conditions. Past ski area development consisting of constructed ski run, access roads, ski lift and lodge facilities in the Daggett Creek watershed. The East Peak Reservoir was constructed in the early 1990s to provide water storage for snowmaking. At the same time, a wetland enhancement mitigation project was implemented downstream of the reservoir. In 2008 it was drained and surveyed and remains unlined. Current watershed conditions are summarized in Section 3.1-2.2 for NV-2+5. Current watershed condition is rated as Good with a Stable trend.

Desired Condition: Desired conditions include: %ERA that remains below the watershed TOC and maintenance of stable channel conditions.

Threshold of Concern/Existing, Proposed and Cumulative %ERAs. The watershed TOC for NV-2+5 is set at 7%. Existing %ERA for watershed NV-2+5 is 3.92%. Implementation of the Project would increase the %ERA by 0.40 to 4.32%. When considering new summer uses and facilities as additive to those actions approved for the MPA 07, the %ERA upon buildout is estimated at 5.70%. Cumulative %ERA would not exceed the numerical watershed TOC of

7%. This %ERA is representative of on-site effects of total disturbance within the Heavenly special use permit area of NV-2+5.

Potential for Cumulative Watershed Effects. The NV-2+5 watershed TOC was set at 7% because this watershed was determined to have low sensitivity to disturbance. No off-site adverse cumulative effects would occur in watershed NV-2+5 from implementation of the Project when considered in the context of other past, present, and reasonably foreseeable future actions. The upper portion of the NV-2+5 watershed has moderate sediment transport ability and low connectivity to the stream channel because of the East Peak Reservoir.

Restoration and Mitigation Strategies. The on-going CWE Restoration Program (Appendix 3.1-D) outlines projects identified in MPA 07 EIR/EIS/EIS for mitigation of past ski area development impacts. Heavenly would continue to implement restoration projects as capital projects are constructed. The on-going Environmental Monitoring Program would continue to identify and prioritize areas for restoration and maintenance.

In addition, future road management, including design, maintenance and monitoring of resort access roads, will be conducted as described in Chapter 2, Section 2.3.5. The Special Use permit between Heavenly Resort and the Forest Service will be amended to incorporate these changes to roads management at Heavenly to ensure these activities are conducted to the same standards as the rest of the Forest Service road network.

IMPACT: WATER-C5: Would the Project have significant cumulative impacts to water resources in watershed NV-3?

CEQA

Analysis: *Not Applicable; Proposed Action and Alternatives*

TRPA

Analysis: *Less than Significant; Proposed Action and Alternatives*

Cumulative Project List. The following projects are considered as past, present or reasonably foreseeable future actions in the NV-3 watershed: MPA 07 projects; Heavenly Edgewood Creek SEZ restoration projects; Boulder Parking Lot BMP Project; Edgewood Lodge and Golf Course Improvement Project; and Kingsbury Grade road improvements and maintenance.

Cumulative Effect(s) of Concern. Desired conditions include: %ERA that remains below the watershed TOC and maintenance of stable channel conditions.

Past and Current Conditions. Past ski area development consisting of constructed ski run, access roads, ski lifts, parking, lodge and skier support facilities in the Edgewood Creek watershed. From 2006 to 2008, Heavenly implemented four

SEZ restoration projects identified in the Edgewood Creek Watershed Assessment and Enhancement Plan. These projects implemented drainage stabilization and SEZ restoration objectives within the Heavenly special use permit area.

Section 3.1-2.2 summarizes current watershed conditions for NV-3. Current watershed condition is rated as Good with a Stable trend.

Desired Condition: Desired conditions include: %ERA that remains below the watershed TOC and maintenance of stable channel conditions.

Threshold of Concern/Existing, Proposed and Cumulative %ERAs. The watershed TOC for NV-3 is set at 5%. Existing %ERA for watershed NV-3 is 5.48%. Implementation of the Panorama Trail would increase the %ERA by 0.04 to 5.52%. When considering the Panorama Trail as additive to those actions approved for the MPA 07, the %ERA upon build out is estimated at 5.61%. Cumulative %ERA would exceed the numerical watershed TOC of 5%. This %ERA is representative of on-site effects of total disturbance within the Heavenly special use permit area of NV-3. As discussed above in the introduction of Section 3.1-4.4, ERAs that approach or exceed a given watershed's defined TOC trigger field verification and monitoring to ascertain whether cumulative watershed effects are actually present and if restoration activities are necessary. MPA 07 mitigation measure 7.5-1 provides for monitoring that detects when further restoration activities would be triggered. Past and current monitoring in the Edgewood Creek watershed report overall watershed conditions to be Good with Stable Trends. On-going water quality, erosion, BMP, and stream condition monitoring will continue to inform ski area management.

Potential for Cumulative Watershed Effects. The NV-3 watershed TOC was set at 5% because this watershed was determined to have moderate sensitivity to disturbance. Although the %ERA would exceed the watershed TOC upon build out of the MPA 07, the cumulative %ERA is based on total permanent disturbance in the watershed and does not fully consider the beneficial effects of restoration projects. Past and future SEZ restoration projects completed in the upper watershed, on-going improvements to Boulder Parking Lot and skier facilities, future ski run and road maintenance actions, and North Bowl Ski Lift replacement (which would move the lift base farther from the stream channel and improve the existing road crossing) would reduce the cumulative effects of new permanent disturbance. Past restoration projects have improved Edgewood Creek floodplain and SEZ connectivity. The SEZ at the base of North Bowl lift and the SEZ above the Boulder Base facilities serve to attenuate potential off-site effects, as indicated by low Turbidity and TSS annual constituent values reported between 2006-2013 (Appendix 3.1-A).

No off-site adverse cumulative effects would occur in watershed NV-3 from implementation of the Project when considered in the context of other past, present, and reasonably foreseeable future actions. Cumulative effects of inter-dependent, inter-related, and foreseeable action within, adjacent to, and downstream of the Heavenly special use permit area would be reduced through:

- Project-level environmental review and mitigation implementation;

- TRPA project review for compliance with the Regional Plan Goals, Policies and Code of Ordinances; and
- On-going implementation of MP 96 and MPA 07 mitigation measures and standard design features.

Restoration and Mitigation Strategies. The on-going CWE Restoration Program (Appendix 3.1-D) outlines projects identified in MPA 07 EIR/EIS/EIS for mitigation of past ski area development impacts. Heavenly would continue to implement restoration projects as capital projects are constructed. On-going monitoring would continue to identify and prioritize areas for restoration and maintenance. Past restoration projects have improved Edgewood Creek floodplain and SEZ connectivity. The SEZ at the base of North Bowl lift and the SEZ above the Boulder Base facilities serve to attenuate potential off-site effects, as indicated by low Turbidity and TSS annual constituent values reported between 2006-2013 (Appendix 3.1-A).

Edge-1 and Edge-2 (Unnamed Tributaries to Edgewood). No adverse cumulative effects would occur in these watersheds from implementation of the Proposed Action when considered in context of when added to other past, present, and reasonably foreseeable future actions. The %ERAs for these watersheds would increase nominally from 0.53 and 4.72 to 0.61 and 4.77 %ERA, respectively, through implementation of the Project. No MPA 07 projects are proposed in these watersheds. No off-site adverse cumulative effects would occur in these watersheds from implementation of the Project when considered in the context of other past, present, and reasonably foreseeable future actions. The Heavenly portion of these watersheds has a low sediment transport ability and low connectivity to stream channels.

Lake Tahoe TMDL Contributions. The approximately 1.8 acres of new permanent disturbance in the forested uplands of the NV-3, EDGE-1 and EDGE-2 watersheds would be offset by restoration and land coverage reductions achieved through USFS initiatives located on National Forest Lands in the Lake Tahoe Basin

NEPA

Analysis: *No Adverse Cumulative Effects; Proposed Action and Alternatives*

The management practices, standards and guidelines of the Forest Plan apply to all Heavenly watersheds. Additionally, NEPA requires a cumulative effects analysis. The Heavenly Ski Area CWE Analysis was first developed in the 1990's as a tool to address the cumulative watershed effects analysis outlined in the TRPA Ski Area Master Plan Guidelines. The procedure for evaluating the cumulative effects of Heavenly Mountain Resort is based on criteria set forth in the Soil and Water Conservation Handbook (Forest Service Handbook 2509.22). Chapter 20 of this Handbook offers a complete description of the authority, objectives and policies of the Forest Service's Cumulative off-site Watershed Effects (CWE) Analysis. The Forest Service's *Soil and Water Conservation Handbook* outlines BMP 7.8 – Cumulative Off-site Watershed Effects, which has

the objective: to protect the identified beneficial uses of water from the combined effects of multiple management activities which individually may not create unacceptable effects, but collectively may result in degraded water-quality conditions.

As described in Chapter 2, Section 2.3.5, planning of future road maintenance and retrofit activities will be done in coordination with Forest Service staff to ensure activities are being conducted and tracked in accordance with current US Forest protocols, as the rest of the LTBMU road network. An annual road maintenance and retrofit plan will be submitted to the Forest Service for review and input and information will be provided to the Forest Service for documentation and tracking in agency databases.

As concluded above for the TRPA analysis, no adverse cumulative effects of past, present and reasonably foreseeable future actions would occur in NV-3.